Y/SUB/06-048395/2

Y-12 GROUNDWATER PROTECTION PROGRAM GROUNDWATER AND SURFACE WATER SAMPLING AND ANALYSIS PLAN FOR CALENDAR YEAR 2007

September 2006

Prepared by

ELVADO ENVIRONMENTAL LLC
Under Subcontract No. 4300048395

for the

Environmental Compliance Department
Environment, Safety, and Health Division
Y-12 National Security Complex
Oak Ridge, Tennessee 37831

Managed by

BWXT Y-12, L.L.C.
for the U.S. DEPARTMENT OF ENERGY
under contract No. DE-AC05-00OR22800

Y-12 NATIONAL SECURITY COMPLEX

MANAGED BY
BWXT Y-12, L.L.C.
FOR THE UNITED STATES
DEPARTMENT OF ENERGY

UCN-13672 (11-03)

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List of Acronyms and Abbreviations

ACO	Analytical Chemistry Organization
Bear Creek Regime	Bear Creek Hydrogeologic Regime
BWXT	BWXT Y-12, L.L.C.
Chestnut Ridge Regime	Chestnut Ridge Hydrogeologic Regime
CY	calendar year
DOE	U.S. Department of Energy
East Fork Regime	Upper East Fork Poplar Creek Hydrogeologic Regime
EPA	U.S. Environmental Protection Agency
GWPP	Groundwater Protection Program
MAROS	Monitoring and Remediation Optimization System
REDOX	oxidation-reduction potential
SPS	sampling priority score
VOCs	volatile organic compounds
Y-12	Y-12 National Security Complex

1.0 INTRODUCTION

This plan provides a description of the groundwater and surface water quality monitoring activities planned for calendar year (CY) 2007 at the U.S. Department of Energy (DOE) Y-12 National Security Complex (Y-12) that will be managed by the Y-12 Groundwater Protection Program (GWPP). Groundwater and surface water monitoring performed by the GWPP during CY 2007 will be in accordance with DOE Order 540.1 requirements and the following goals:

- to protect the worker, the public, and the environment;
- to maintain surveillance of existing and potential groundwater contamination sources;
- to provide for the early detection of groundwater contamination and determine the quality of groundwater and surface water where contaminants are most likely to migrate beyond the Oak Ridge Reservation property line;
- to identify and characterize long-term trends in groundwater quality at Y-12; and
- to provide data to support decisions concerning the management and protection of groundwater resources.

Groundwater and surface water monitoring during CY 2007 will be performed primarily in three hydrogeologic regimes at Y-12: the Bear Creek Hydrogeologic Regime (Bear Creek Regime), the Upper East Fork Poplar Creek Hydrogeologic Regime (East Fork Regime), and the Chestnut Ridge Hydrogeologic Regime (Chestnut Ridge Regime). The Bear Creek and East Fork regimes are located in Bear Creek Valley, and the Chestnut Ridge Regime is located south of Y-12 (Figure A.1). Additional surface water monitoring will be performed north of Pine Ridge, along the boundary of the Oak Ridge Reservation (Figure A.1).

Modifications to the CY 2007 monitoring program may be necessary during implementation. Changes in programmatic requirements may alter the analytes specified for selected monitoring wells or may add or remove wells from the planned monitoring network. All modifications to the monitoring program will be approved by the Y-12 GWPP manager and documented as addenda to this sampling and analysis plan.

The following sections of this report provide details regarding the CY 2007 groundwater and surface water monitoring activities. Section 2 describes the monitoring locations in each regime and the processes used to select the sampling locations. A description of the field measurements and laboratory analytes is provided in Section 3; sample collection methods and procedures are described in Section 4; and Section 5 lists the documents cited for more detailed operational and technical information.

The narrative sections of the report reference several appendices. Figures (maps and diagrams) and tables (excluding data summary tables presented in the narrative sections) are in Appendix A and Appendix B, respectively. The monitoring frequency and selection criteria for each sampling location is in Appendix C. Laboratory requirements (bottle lists, holding times, etc.) are provided in Appendix D. If issued, addenda to this plan will be inserted in Appendix E, and Groundwater Monitoring Schedules (when issued) will be inserted in Appendix F. Guidance for managing purged groundwater is provided in Appendix G.

2.0 MONITORING LOCATIONS

The monitoring locations to be sampled by the Y-12 GWPP during CY 2007 (Table B.1) were selected based on results of: (1) a comprehensive assessment of the Y-12 GWPP using the Monitoring and Remediation Optimization System (MAROS) software (BWXT Y-12, L.L.C. [BWXT] 2005), and (2) the annual sampling priority score (SPS) determined for all monitoring wells granted active status in accordance with the Y-12 GWPP Monitoring Optimization Plan (BWXT 2003). The MAROS assessment provided recommendations (e.g., sampling frequency) that prioritize monitoring locations with sufficient analytical data obtained between CY 1996 to CY 2004. Based on further review of the MAROS assessment results, a total of 112 locations were selected for sampling in CY 2007 that included semiannual, annual, and biennial sampling frequency recommendations (Appendix C). Information used to calculate the CY 2007 SPS (e.g., sampling history from CY 1986 to CY 2006, principal contaminant concentrations, and contaminant concentration trend significance) was used to select 17 additional wells for sampling in CY 2007 that had MAROS recommendations of "Review" or "Remove" (Appendix C).

The Y-12 GWPP monitoring network for CY 2007 includes 142 monitoring locations (Table B.1): 44 located in the Bear Creek Regime (Figure A.2), ten located in the Chestnut Ridge Regime (Figure A.3), 84 located in the East Fork Regime (Figure A.4), and four located north of Pine Ridge (Figure A.5). Groundwater samples will be collected from a total of 114 monitoring wells, including 40 wells in the Bear Creek Regime (Figure A.2), five wells in the Chestnut Ridge Regime, and 70 wells in the East Fork Regime (Figure A.4). Well GW-722, located in the East Fork Regime, contains a Westbay™ multiport sampling system and is scheduled for sample collection from 10 ports at different depths in the well (Figure A.5). Wells GW-954 and GW-956, also located in the East Fork Regime, are equipped with multiple BarCad® pumps and are scheduled for sample collection from three (GW-954) or four (GW-956) different depths in each well (Figure A.6). Samples of groundwater discharging from five natural springs will be collected during CY 2007, including three springs (SS-1, SS-4, and SS-5) in the Bear Creek Regime (Figure A.2) and two springs (SCR2.1SP and SCR2.2SP) in the Chestnut Ridge Regime (Figure A.3).

Surface water samples will be collected from a total of nine sampling locations during CY 2007, including two locations in the Bear Creek Regime, three locations in the Chestnut Ridge Regime, and four locations north of Pine Ridge. In the Bear Creek Regime, samples will be collected from Bear Creek at one sampling station located from about 4.5 kilometers upstream of the confluence of Bear Creek and East Fork Poplar Creek (BCK-04.55) and from one sampling station along a northern tributary (NT-01) to Bear Creek (Figure A.2). The tributaries located in the Chestnut Ridge Regime have been numbered from west to east (SCR1 through SCR5) and surface water samples will be collected from three of the tributaries at stations (SCR1.5SW, SCR3.5SW, and S17 [located in SCR5]) located along the north side of Bethel Valley Road (Figure A.3). The surface water sampling locations north of Pine Ridge include three tributaries (NPR07.0SW, NPR12.0SW, and NPR23.0SW) near the Scarboro Community and one location (GHK2.51ESW) near Country Club Estates (Figure A.7).

3.0 FIELD MEASUREMENTS AND ANALYTICAL PARAMETERS

Before collecting samples at each monitoring location, field personnel will record (on Field Data Sheets) the following field measurements (Table B.2):

- depth to the static water level in monitoring wells;
- pH;
- water temperature;
- conductivity;
- dissolved oxygen; and
- oxidation-reduction potential (REDOX)

Field measurement of dissolved oxygen and REDOX will not be obtained for sampling ports of monitoring wells equipped with a Westbay™ multiport sampling system. Instead of measuring the depth to the static water level in each Westbay™ sampling zone, the potentiometric head (in ft) will be calculated from subsurface pressure measurements obtained. The static water level in each BarCad® sampling zone will be an estimate based on the volume of groundwater purged during the initial cycle.

For this Sampling and Analysis Plan, specific analytes are grouped by analytical method or by type (e.g., trace metals) and referenced as parameter groups (Table B.1 and Table B.2). In addition to field measurements, all groundwater and surface water samples will be analyzed for the following suite of parameters (identified as the Standard Administrative Parameter Group):

- miscellaneous laboratory analytes (turbidity, total suspended solids and total dissolved solids);
- major anions;
- trace metals (includes major cations);
- a comprehensive suite of volatile organic compounds (VOCs); and
- gross alpha and gross beta activity.

In addition to the analytes included in the Standard Administrative Parameter Group, samples from selected locations will be analyzed for specific radionuclides and/or VOCs. Some of these analyses will supplement gross alpha and/or gross beta activity results, especially in cases where the gross activity reporting limits are elevated from interferences caused by a high dissolved solid content of the groundwater sample (see Appendix D).

4.0 SAMPLE PLANNING, COLLECTION, AND HANDLING

The monitoring wells, springs, and surface water stations included in the GWPP monitoring network for CY 2007 are assembled into sample groups (e.g., BC-1) for sample collection, sample tracking, and data management purposes. A total of 18 sample groups are scheduled for monitoring in CY 2007, with samples collected from five to seven groups per quarter (Table B.1). A Groundwater Monitoring Schedule will be prepared for each quarterly sampling event by GWPP personnel based on Table B.1 that includes additional information necessary for field personnel to collect the required samples (e.g., previous pumping rates to purge and sample each well).

Unfiltered samples will be collected semiannually (74 samples) or annually (105 samples, including 28 biennial samples) from the monitoring locations during CY 2007. As summarized below, the number of samples to be collected during each CY quarter will range from 41 to 48, for an annual total of 179 samples.

HYDROGEOLOGIC REGIME/AREA	NUMBER OF SAMPLES PER QUARTER OF CY 2007			
	1st	2nd	3rd	4th
Bear Creek Regime	16	8	28	0
Chestnut Ridge Regime	0	10	0	0
East Fork Regime	27	29	20	37
North of Pine Ridge	0	0	0	4
TOTAL:	**43**	**47**	**48**	**41**

Personnel from the Y-12 Analytical Chemistry Organization (ACO) will be responsible for collection, transportation, and chain-of-custody control of most groundwater and surface water samples. Personnel from the Environment, Safety, and Health Division will be responsible for collection, transportation, and chain-of-custody control of the groundwater samples from Westbay well GW-722. Based on the analytical parameters for the CY 2007 monitoring locations (Table B.1 and Table B.2), ACO personnel will prepare bottle lists that specify the sample container type, size, preservative, and the laboratory test identification needed for each sampling location (see Appendix D). Sample collection will be performed in accordance with the most recent version of operating procedures for obtaining groundwater samples (BWXT 2002a, BWXT 2004a, BWXT 2004b, and BWXT 2006a) and surface water samples (BWXT 2002b). All field and laboratory activities will be performed in accordance with applicable requirements of the Y-12 Integrated Safety Management System and associated job hazard analyses.

Groundwater samples will be collected from all monitoring wells not equipped with a Westbay™ multiport sampling system or with a multilevel BarCad® pump system using the low-flow minimal drawdown method (low-flow method) during CY 2007. For the low-flow method, a bladder pump is permanently installed in each well that is scheduled for sample collection. If well construction prevents permanent installation (e.g., flush-mounted wells), then the pump and tubing will be installed at least 24 hours before sample collection and will be removed when sampling is completed. In accordance with the groundwater sampling procedure for the low-flow method (BWXT 2004a), groundwater is purged, and subsequently sampled, from the well at a flow rate (<300 milliliters per minute) which ensures minimal drawdown of the static water level, therefore isolating the stagnant water column above the intake of the pump. Groundwater samples are collected from a well after the water level is in steady-state drawdown (<0.1 ft over a 15-minute interval) and field parameters (pH, conductivity, water temperature, REDOX, and dissolved oxygen) have stabilized (minimal variation over four consecutive readings).

Groundwater sampling and pressure profiling using a Westbay™ multiport sampling system at well GW-722 in the East Fork Regime will be performed in accordance with the operating procedures (BWXT 2002a and BWXT 2006a). The groundwater samples from each sampling port (Figure A.5) will be collected in 250-milliliter nonvented stainless steel Westbay™ sample collection bottles filled at the designated depth in the well. Once filled, the bottles will be raised to the surface and the groundwater will be transferred to laboratory sample containers. The sample collection bottles will be lowered, filled, and retrieved as many times as needed to completely fill the laboratory sample bottles. Groundwater in the first sample collection bottles retrieved from each sampling port will be used as a "formation rinse" to obtain field measurements and to condition the sample collection bottle for each zone.

Groundwater sampling using multilevel BarCad® pump (positive displacement gas drive) systems installed in wells GW-954 and GW-956 in the East Fork Regime will be performed in accordance with written guidance provided by the GWPP which incorporates the standard operating procedures provided by the manufacturer (BESST Inc. 2005). These wells have three (GW-954) or four (GW-956) BarCad® pumps installed at discrete depth intervals with a riser casing (polyvinyl chloride) connecting each pump to the surface (Figure A.6). The manifold installed at the top of the riser casing for each pump has two fittings: one for gas pressurization and one for sample collection. A pressure control unit will be used by field personnel to regulate the amount of nitrogen gas used to displace groundwater in the riser casing above the BarCad® pump. The BarCad® unit consists of an outer porous ceramic screen and an inner steel mesh (60 microns) screen that allow water to enter under hydrostatic pressure, and a check valve at the top of the unit that seals upon pressurization. The displaced groundwater is forced upward through the sample collection tube and discharged at the surface during well purging and sample collection. Releasing the nitrogen pressure permits groundwater to move from the formation and sand pack through the BarCad® unit into the riser casing for subsequent cycles of discharge through the sample collection tube. The system is purged to remove standing water from the riser pipe, to allow fresh formation water to recharge the sand pack interval, and to obtain field measurements. Typical purge rates for BarCad® pump systems are 500-800 milliliters per minute. Groundwater samples will be collected from the sample return line after the following conditions are met: (1) at least three purge cycles are performed; (2) the volume of subsequent purge cycles is at least 50% of the initial purge volume; and (3) the total water volume purged exceeds 50% of the sand pack volume.

In addition to the groundwater and surface water samples, field blanks and equipment rinsate samples will be collected at the frequencies and analyzed for the parameter groups specified on Table B.1. Field blank samples will be collected from at least 10% of the sample groups. Therefore, one field blank will be collected during each quarter of CY 2007: in the Bear Creek Regime during the first and third quarters and in the East Fork Regime during the second and fourth quarters. Equipment rinsate samples will be collected from Westbay well GW-722 (Table B.1). The rinsate sample will be collected immediately after field-cleaning the sampling equipment used to collect samples from the last sampling port (GW-722-17).

Trip blank samples, field duplicate samples, and laboratory quality assurance samples will be prepared and analyzed as specified in the *Quality Assurance Plan for the Analytical Chemistry Organization* (BWXT 2006b) using applicable analytical procedures. Trip blank samples will be prepared for each cooler used to transport samples for volatile organic analyses. Duplicate samples will be collected from at least 10% of the sampling locations. A total of 22 field duplicate samples will be collected during CY 2007, including six in the Bear Creek Regime, two in the Chestnut Ridge Regime, and15 in the East Fork Regime (Table B.1).

All groundwater and surface water samples will be relinquished under chain-of-custody control to the appropriate Y-12 ACO laboratory that will perform the analyses. The Y-12 ACO laboratories will perform each analyses within established holding times and deliver results in hard copy and electronic format within established turnaround times (see Appendix D).

5.0 REFERENCES

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APPENDIX A

FIGURES

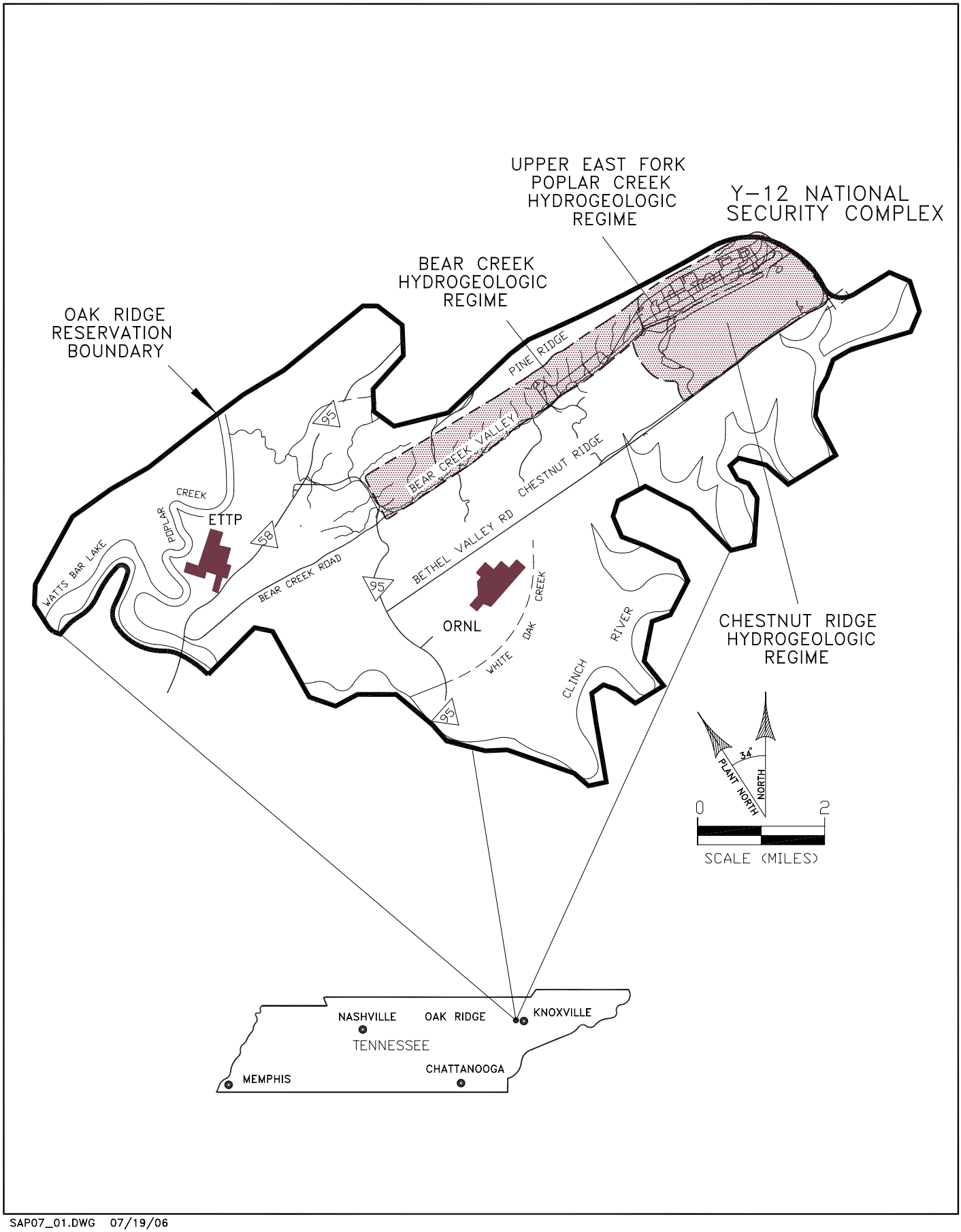

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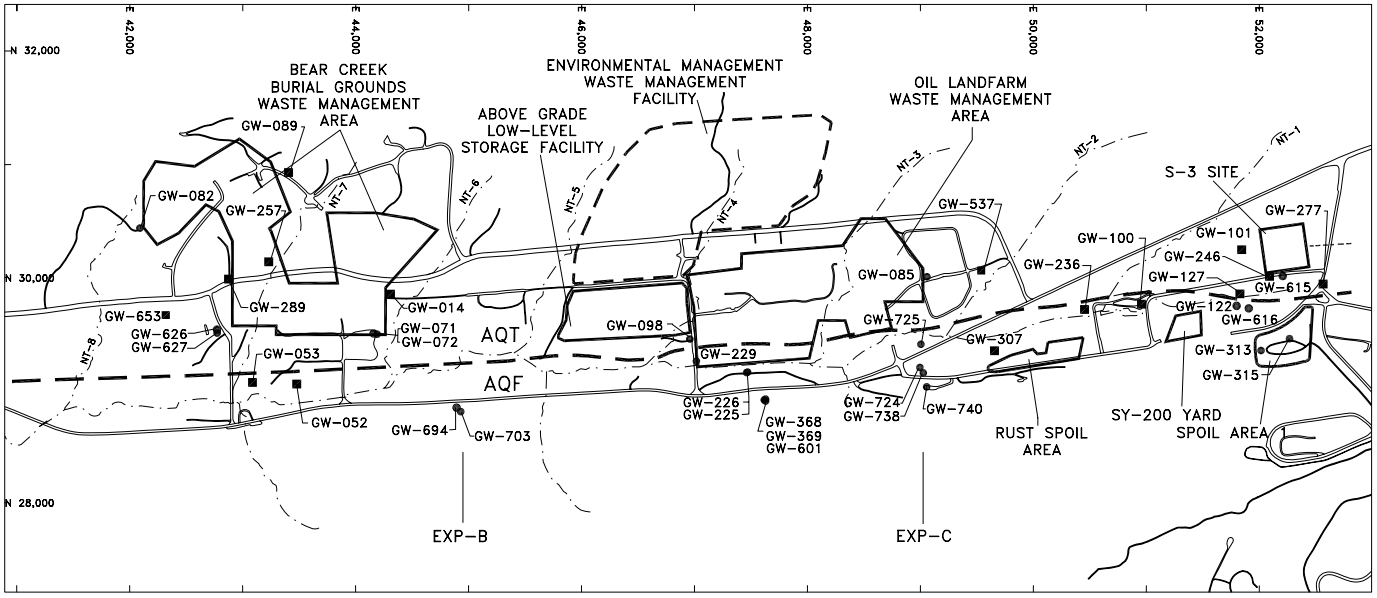
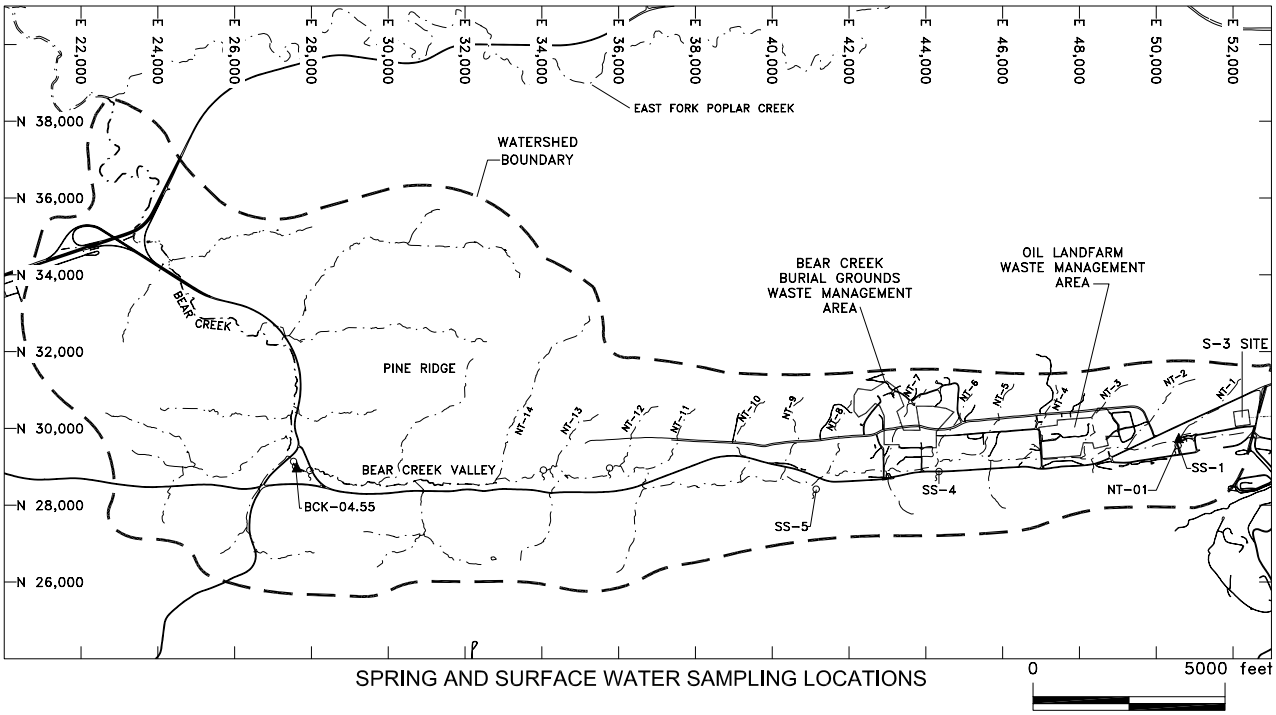
Fig. A.1. Hydrogeologic regimes at the Y-12 National Security Complex.





EXPLANATION

- ■ — Water Table Monitoring Well
- ● — Bedrock Monitoring Well
- ▲ — Surface Water Sampling Station
- ♀ — Spring Sampling Station
- EXP-C — Exit Pathway, Maynardville Limestone Picket
- — Surface Drainage Feature
- NT-5 — North Tributary
- AQT — Aquitard
- — Approximate Nolichucky Shale\Maynardville Limestone Contact
- AQF — Aquifer

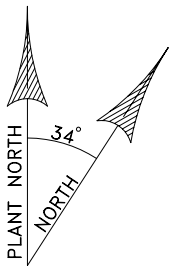


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Fig. A.2. CY 2007 sampling locations in the Bear Creek Hydrogeologic Regime.

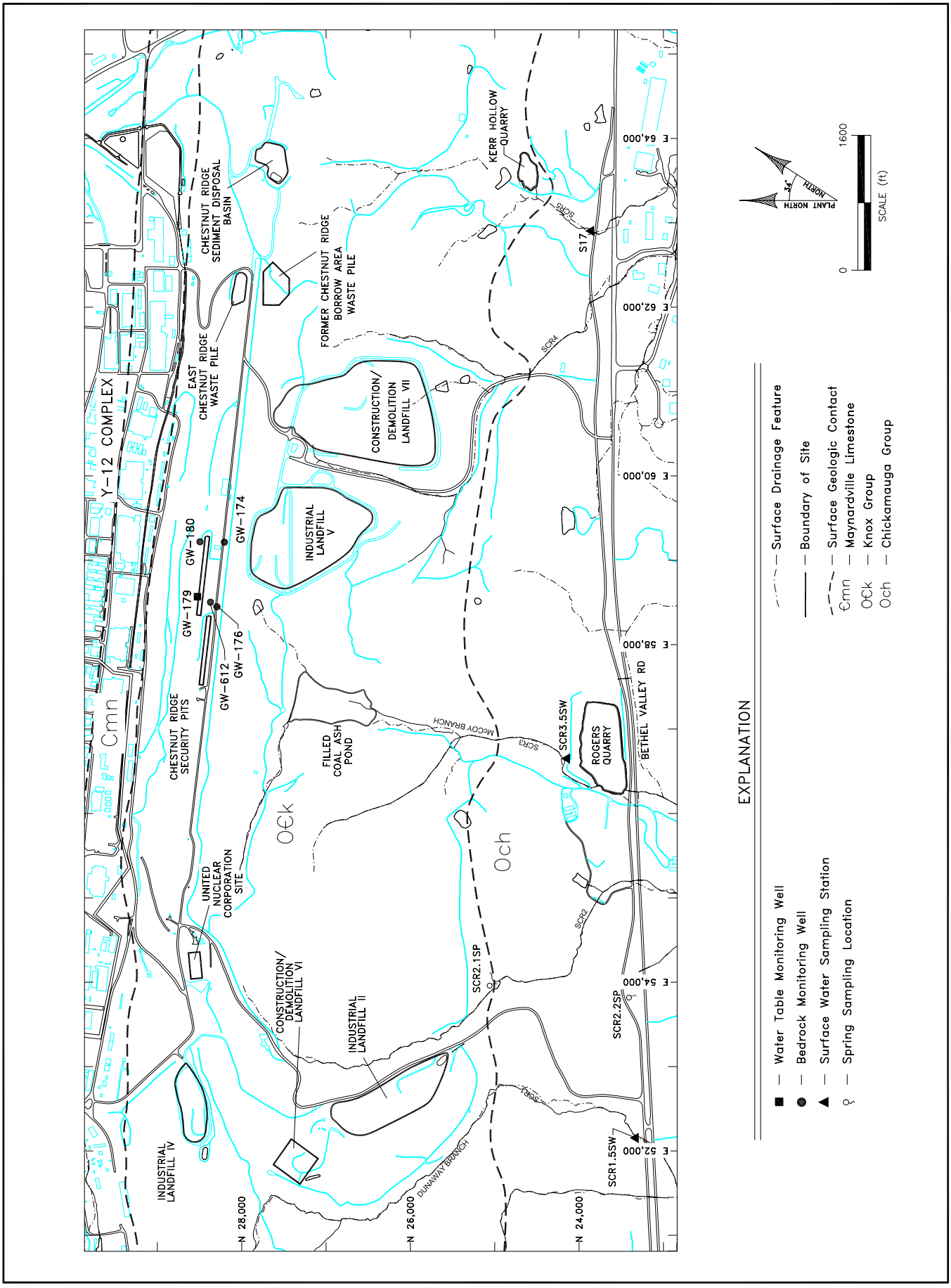

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Fig. A.3. CY 2007 sampling locations in the Chestnut Ridge Hydrogeologic Regime.

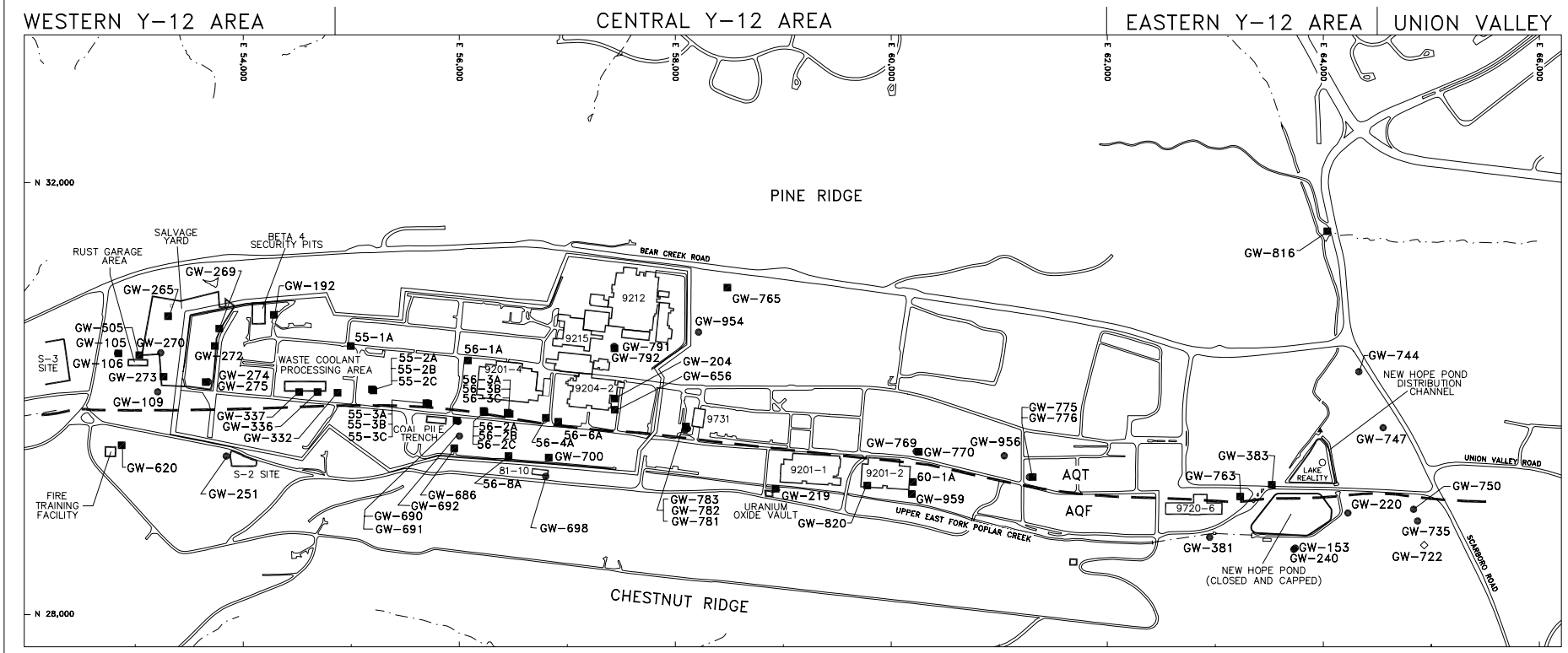
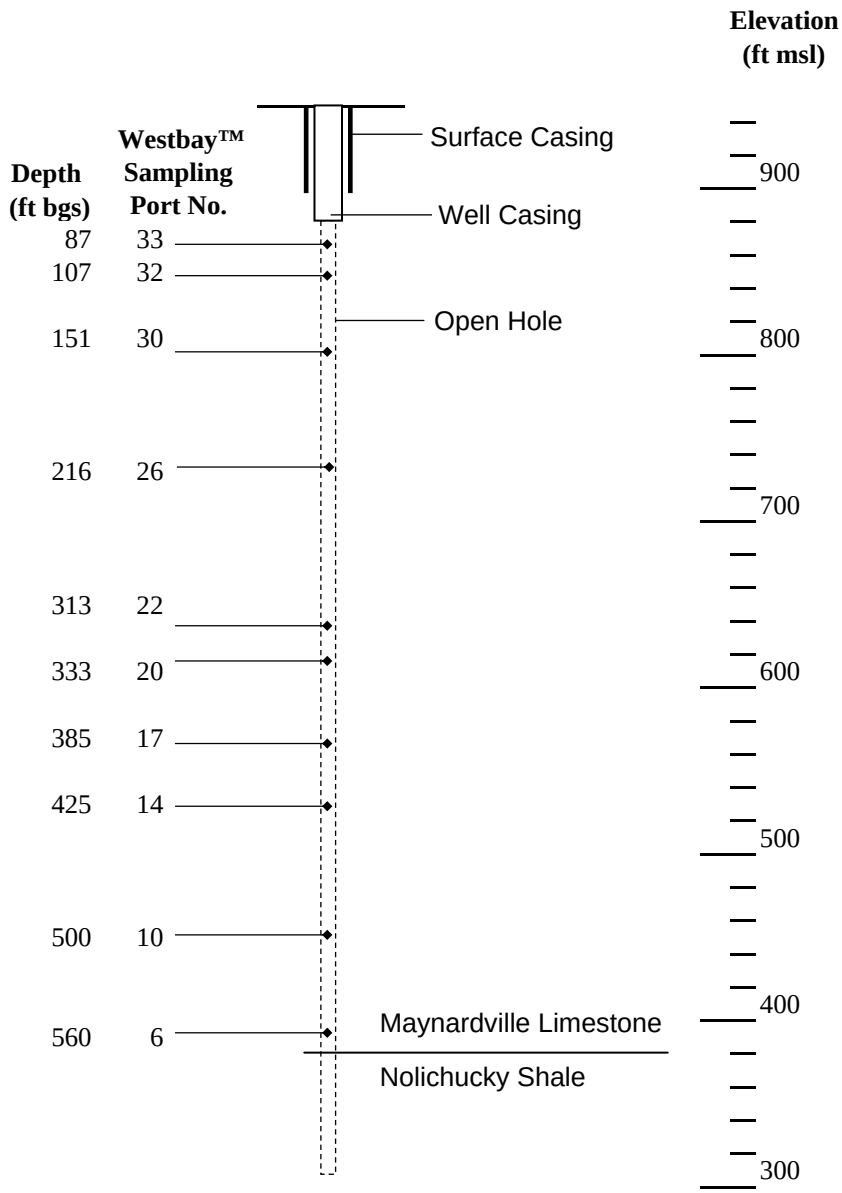
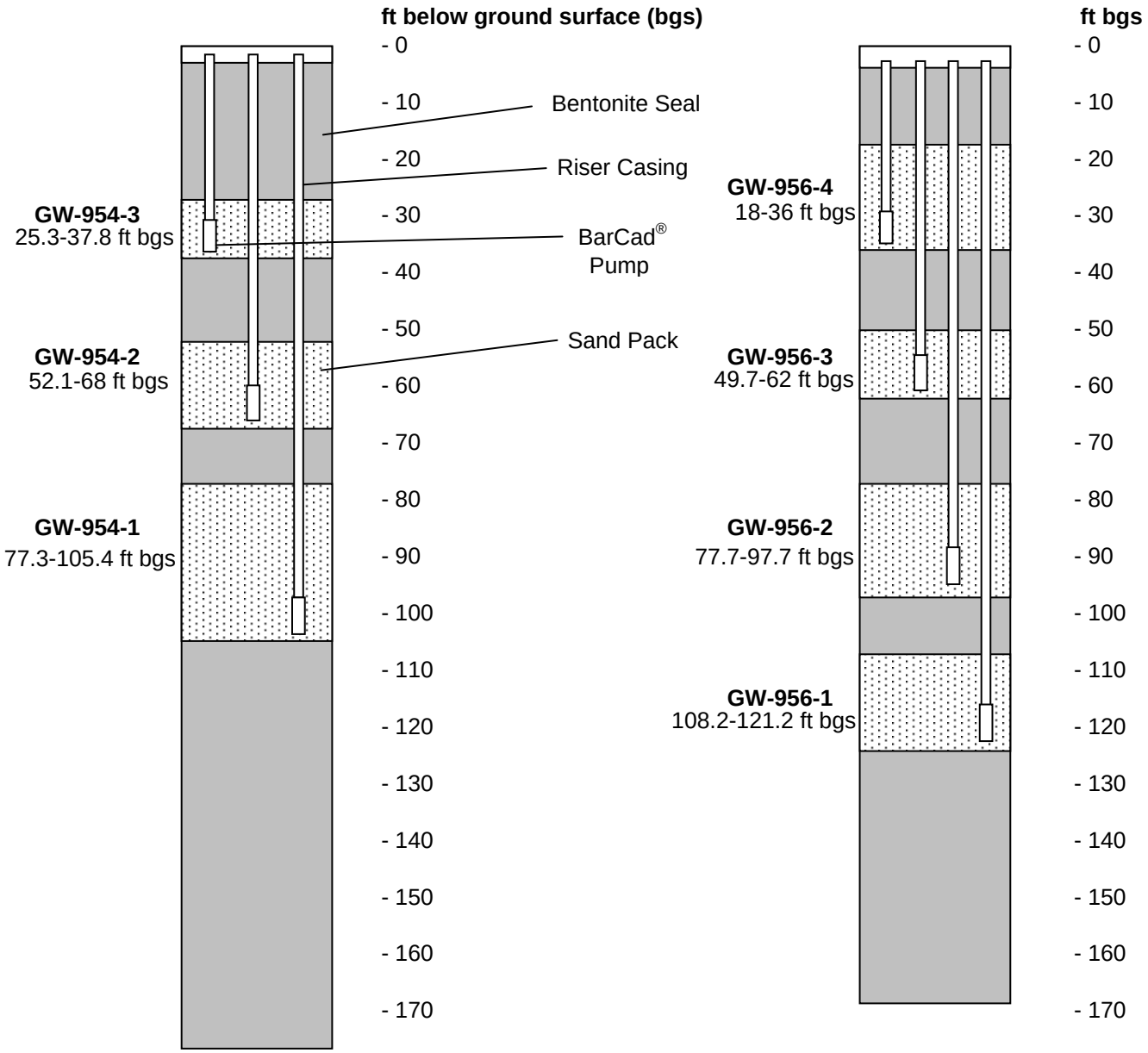


Fig. A.4. CY 2007 sampling locations in the Upper East Fork Poplar Creek Hydrogeologic Regime.



SAP07 Fig5.xls

Fig. A.5. Westbay™ monitoring system sampling port depths in well GW-722.



SAP07 Fig6.xls

Fig. A.6. BarCad® pump system sampling depths in wells GW-954 and GW-956.

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Fig. A.7. CY 2007 surface water sampling locations north of Pine Ridge.

APPENDIX B

TABLES

Table B.1. Sampling sequence, frequency, and analytical parameters for groundwater and surface water monitoring during CY 2007

Sample Group [1]	Location [2]	Sampling Point [3]	Duplicate [4]	Monitoring Driver [5]	Parameter Groups [6]
Bear Creek Hydrogeologic Regime					
BC-1 (Q1, Q3)	BG	GW-626		SMP	STD
	BG	GW-627		SMP	STD
	BG	GW-014	Q3	SMP	STD
	BG	GW-071*	Q1	SMP	STD
	OLF	GW-225		SMP	STD
	OLF	GW-226		SMP	STD
	OLF	GW-085		SMP	STD
	S3	GW-246		SMP	STD, RAD(3,12)
	FIELD BLANK				VOC(1)
BC-2 (Q1)	BG	GW-653		SMP	STD, VOC(2)
	BG	GW-082		SMP	STD, VOC(2)
	BG	GW-257		SMP	STD
	BG	GW-289		SMP	STD
	BG	GW-089	Q1	SMP	STD
	BG	GW-052		SMP	STD
	BG	GW-053		SMP	STD, VOC(2)
	BG	GW-072*		SMP	STD
BC-3 (Q2)	OLF	GW-098		SMP	STD
	OLF	GW-229		SMP	STD
	OLF	GW-368		SMP	STD
	OLF	GW-369		SMP	STD
	OLF	GW-601		SMP	STD
	RS	GW-307		SMP	STD
	SPI	GW-313	Q2	SMP	STD
	SPI	GW-315		SMP	STD
BC-4 (Q2)	OLF	GW-537		SMP	STD
	S3	GW-236		SMP	STD
	S3	GW-100	Q2	SMP	STD
	S3	GW-127		SMP	STD
	S3	GW-122		SMP	STD
	S3	GW-101		SMP	STD
	S3	GW-616		SMP	STD
	S3	GW-615		SMP	STD, RAD(3,12)
	S3	GW-277		SMP	STD, RAD(3,12)
BC-5 (Q3)	EXP-B	GW-694	Q3	SMP	STD
	EXP-B	GW-703		SMP	STD
	EXP-C	GW-725		SMP	STD
	EXP-C	GW-724		SMP	STD
	EXP-C	GW-738		SMP	STD
	EXP-C	GW-740		SMP	STD

Table B.1 (continued)

Sample Group [1]	Location [2]	Sampling Point [3]	Duplicate [4]	Monitoring Driver [5]	Parameter Groups [6]
BC-6 (Q3)	EXP-SW	BCK-04.55	Q2	EXP	STD
	EXP-SW	SS-5		EXP	STD
	EXP-SW	SS-4		EXP	STD
	EXP-SW	SS-1		EXP	STD
	EXP-SW	NT-01		EXP	STD
Chestnut Ridge Hydrogeologic Regime					
CR-1 (Q2)	CRSP	GW-174		SMP	STD
	CRSP	GW-180	Q2	SMP	STD
	CRSP	GW-179		SMP	STD
	CRSP	GW-176		SMP	STD
	CRSP	GW-612		SMP	STD
CR-2 (Q2)	EXP-SW	SCR1.5SW		EXP	STD
	EXP-SW	SCR2.1SP		EXP	STD
	EXP-SW	SCR2.2SP		EXP	STD
	EXP-SW	SCR3.5SW		EXP	STD
	EXP-SW	S17	Q2	EXP	STD
Upper East Fork Poplar Creek Hydrogeologic Regime/North of Pine Ridge					
EF-1 (Q1,Q3)	GRID B3	55-2A*		SMP	STD
	GRID B3	55-2B*		SMP	STD
	B9201-5	55-3A		SMP	STD
	B9201-5	55-3B		SMP	STD, VOC(2)
	B9201-5	55-3C		SMP	STD
	Y12	56-3A	Q1	SMP	STD
	Y12	56-3B		SMP	STD, VOC(2)
	Y12	56-3C		SMP	STD
	Y12	56-4A	Q3	SMP	STD
	Y12	56-6A		SMP	STD
EF-2 (Q1)	GRID B3	55-2C*		SMP	STD
	GRID C3	56-2A	Q1	SMP	STD
	GRID C3	56-2B		SMP	STD
	GRID C3	56-2C		SMP	STD, VOC(2)
	SY	GW-272		SMP	STD, RAD(3,12)
	SY	GW-274		SMP	STD, RAD(3,12)
	SY	GW-275		SMP	STD, RAD(3,12)
	WCPA	GW-337		SMP	STD
	WCPA	GW-336		SMP	STD
	WCPA	GW-332		SMP	STD

Table B.1 (continued)

Sample Group [1]	Location [2]	Sampling Point [3]	Duplicate [4]	Monitoring Driver [5]	Parameter Groups [6]
EF-3 (Q1)	EXP-SR	GW-816		SMP	STD
	GRID K1	GW-744		SMP	STD
	GRID K2	GW-747		SMP	STD
	EXP-J	GW-750		SMP	STD
	EXP-J	GW-735	Q1	SMP	STD
	NHP	GW-240		SMP	STD
	NHP	GW-153		SMP	STD
EF-4 (Q3)	EXP-J	GW-722-06		EXP	STD
	EXP-J	GW-722-30		EXP	STD
	EXP-J	GW-722-26		EXP	STD
	EXP-J	GW-722-32	Q3	EXP	STD
	EXP-J	GW-722-33		EXP	STD
	EXP-J	GW-722-10		EXP	STD
	EXP-J	GW-722-22		EXP	STD
	EXP-J	GW-722-20		EXP	STD
	EXP-J	GW-722-14		EXP	STD
	EXP-J	GW-722-17		EXP	STD
	RINSATE SAMPLE				STD
EF-5 (Q2,Q4)	Y12	56-1A		SMP	STD
	Y12	56-8A		SMP	STD
	SY	GW-265	Q2	SMP	STD
	SY	GW-269		SMP	STD
	B8110	GW-698		SMP	STD
	CPT	GW-686	Q4	SMP	STD
	Y12	GW-954-1		SMP	STD
	Y12	GW-954-2		SMP	STD
	Y12	GW-954-3		SMP	STD
EF-6 (Q2,Q4)	Y12	GW-956-1	Q2	SMP	STD
	Y12	GW-956-2		SMP	STD
	Y12	GW-956-3		SMP	STD
	Y12	GW-956-4		SMP	STD
	Y12	60-1A		SMP	STD
	B9201-2	GW-820		SMP	STD
	GRID G3	GW-769		SMP	STD
	GRID G3	GW-770		SMP	STD
	NHP	GW-383	Q4	SMP	STD
	NHP	GW-220		SMP	STD
	FIELD BLANK				VOC(1)

Table B.1 (continued)

Sample Group [1]	Location [2]	Sampling Point [3]	Duplicate [4]	Monitoring Driver [5]	Parameter Groups [6]
EF-7 (Q2)	GRID B2	55-1A		SMP	STD
	B4	GW-192		SMP	STD
	SY	GW-273		SMP	STD
	SY	GW-270	Q2	SMP	STD
	RG	GW-505		SMP	STD
	S3	GW-105		SMP	STD
	S3	GW-106		SMP	STD
	S3	GW-109		SMP	STD, RAD(3,12)
	FTF	GW-620		SMP	STD
	S2	GW-251		SMP	STD
EF-8 (Q4)	GRID E1	GW-765		SMP	STD
	B9201-2	GW-959		SMP	STD
	GRID E3	GW-781		SMP	STD
	GRID E3	GW-782		SMP	STD, VOC(2)
	GRID E3	GW-783		SMP	STD
	UOV	GW-219		SMP	STD
	GRID H3	GW-775	Q4	SMP	STD
	GRID H3	GW-776		SMP	STD
	GRID JP	GW-763		SMP	STD
	NHP	GW-381		SMP	STD
EF-9 (Q4)	CPT	GW-690		SMP	STD
	CPT	GW-691		SMP	STD
	CPT	GW-692		SMP	STD
	B8110	GW-700	Q4	SMP	STD
	GRID D2	GW-791		SMP	STD
	GRID D2	GW-792		SMP	STD
	T0134	GW-204		SMP	STD
	T0134	GW-656		SMP	STD
EF-10 (Q4)	EXP-NPR	NPR07.0SW		EXP	STD
	EXP-NPR	NPR12.0SW	Q4	EXP	STD
	EXP-NPR	NPR23.0SW		EXP	STD
	EXP-NPR	GHK2.51WSW		EXP	STD

Notes:

1 Samples will be collected during the calendar year quarter as specified (e.g., Q1). Details regarding the monitoring frequency for each location is provided in Appendix C.

2 **Bear Creek Hydrogeologic Regime**

BG - Bear Creek Burial Grounds Waste Management Area
EXP-B - Exit Pathway Picket B
EXP-C - Exit Pathway Picket C
EXP-SW - Spring or Surface Water Location
OLF - Oil Landfarm Waste Management Area
RS - Rust Spoil Area
S3 - S3 Site
SPI - Spoil Area I

Table B.1 (continued)

Notes: (continued)

2 (continued)

Chestnut Ridge Hydrogeologic Regime

CRSP	-	Chestnut Ridge Security Pits
EXP-SW	-	Spring or surface water sampling location

Upper East Fork Poplar Creek Hydrogeologic Regime/North of Pine Ridge

B4	-	Beta-4 Security Pits
B8110	-	Building 81-10
B9201-2	-	Building 9201-2
B9201-5	-	Building 9201-5
CPT	-	Coal Pile Trench
EXP-E	-	Maynardville Limestone Exit Pathway Picket E
EXP-J	-	Maynardville Limestone Exit Pathway Picket J
EXP-NPR	-	Surface water sampling station located where drainage exits the Oak Ridge Reservation, north of Pine Ridge
EXP-SR	-	Exit pathway well in the gap through Pine Ridge along Scarboro Road
FTF	-	Fire Training Facility
GRID	-	Comprehensive Groundwater Monitoring Plan Grid Location
NHP	-	New Hope Pond
RG	-	Rust Garage Area
T0134	-	Underground Storage Tank 0134-U
S2	-	S-2 Site
S3	-	S-3 Site
SY	-	Y-12 Salvage Yard
UOV	-	Uranium Oxide Vault
WCPA	-	Waste Coolant Processing Area
Y12	-	Y-12 Complex

3

BCK	-	Bear Creek Kilometer (surface water station)
GW	-	Groundwater monitoring well
GHK	-	Gum Hollow Kilometer (surface water station)
NPR	-	North of Pine Ridge (surface water station)
NT	-	North Tributary to Bear Creek (surface water station)
S17	-	Surface water station in SCR5
SCR	-	South Chestnut Ridge (spring or surface water station)
SS	-	Spring sampling location: South Side of Bear Creek
*	-	Collect samples concurrently during the first quarter from nested wells: GW-071(BC-1) with GW-072 (BC-2); and 55-2A and 55-2B (EF-1) with 55-2C (EF-2)

4 Q_ - Field duplicate samples will be collected at these locations during the quarter(s) specified.

5

EXP	-	DOE Order Exit Pathway/Perimeter Monitoring
SMP		DOE Order Surveillance Monitoring

Table B.1 (continued)

Notes: (continued)

6 Table B.2 provides a comprehensive list of analytes, analytical methods, and the associated parameter group.

STD- Standard administrative parameter group, including the following elementary parameter groups:

FLD	-	Field measurements
CHEM	-	Miscellaneous laboratory analytes (e.g., dissolved solids) and anions
MET(1)	-	Metals
VOC(1)	-	Volatile organic compounds
VOC(2)	-	1,4-Dioxane
RAD(1)	-	Gross alpha and gross beta activity

Radionuclide Elementary Parameter Groups:

RAD(3)	-	Uranium-234, -235, and -238
RAD(12)	-	Technetium-99

Table B.2. Field measurements and analytes that comprise the elementary parameter groups for CY 2007 groundwater and surface water samples

Parameter Group	Measurement or Analyte	Analytical Method [1]	Reporting Limit [2]	Units [3]
FLD	Depth to Water	NA	NA	ft
	Water Temperature	NA	NA	centigrade
	pH	NA	NA	pH units
	Conductivity	NA	NA	µmho/cm
	Dissolved Oxygen	NA	NA	ppm
	Oxidation-Reduction Potential (REDOX)	NA	NA	mV
CHEM (miscellaneous)	Total Dissolved Solids	EPA-160.1	1	mg/L
	Total Suspended Solids	EPA-160.2	1	mg/L
	Turbidity	EPA-180.1	0.1	NTU
CHEM (anions)	Alkalinity - HCO3	EPA-310.1	1.0	mg/L
	Alkalinity - CO3	EPA-310.1	1.0	mg/L
	Chloride	EPA-300.0	0.2	mg/L
	Fluoride	EPA-340.2	0.1	mg/L
	Nitrate (as Nitrogen)	EPA-300.0	0.028	mg/L
	Sulfate	EPA-300.0	0.25	mg/L
MET(1)	Aluminum	SW846-6010B	0.2	mg/L
	Antimony	EPA-200.8	0.0025	mg/L
	Arsenic	EPA-200.8	0.005	mg/L
	Barium	SW846-6010B	0.004	mg/L
	Beryllium	SW846-6010B	0.0005	mg/L
	Boron	SW846-6010B	0.1	mg/L
	Cadmium	EPA-200.8	0.0025	mg/L
	Calcium	SW846-6010B	0.2	mg/L
	Chromium	EPA-200.8	0.01	mg/L
	Cobalt	SW846-6010B	0.02	mg/L
	Copper	SW846-6010B	0.02	mg/L
	Iron	SW846-6010B	0.05	mg/L
	Lead	EPA-200.8	0.0005	mg/L
	Lithium	SW846-6010B	0.01	mg/L
	Magnesium	SW846-6010B	0.2	mg/L
	Manganese	SW846-6010B	0.005	mg/L
	Mercury	SW846-7470	0.0002	mg/L
	Molybdenum	SW846-6010B	0.05	mg/L
	Nickel	EPA-200.8	0.005	mg/L
	Potassium	SW846-6010B	2	mg/L
	Selenium	EPA-200.8	0.01	mg/L
	Silver	SW846-6010B	0.02	mg/L

Table B.2 (continued)

Parameter Group	Analyte	Analytical Method [1]	Reporting Limit [2]	Units [3]
MET(1) (continued)	Sodium	SW846-6010B	0.2	mg/L
	Strontium	SW846-6010B	0.005	mg/L
	Thallium	EPA-200.8	0.0005	mg/L
	Thorium	SW846-6010B	0.2	mg/L
	Uranium	EPA-200.8	0.0005	mg/L
	Vanadium	SW846-6010B	0.02	mg/L
	Zinc	SW846-6010B	0.05	mg/L
VOC(1)	Acetone	SW846-8260B-UP	10	µg/L
	Acrolein	SW846-8260B-UP	10	µg/L
	Acrylonitrile	SW846-8260B-UP	5	µg/L
	Benzene	SW846-8260B-UP	5	µg/L
	Bromochloromethane	SW846-8260B-UP	5	µg/L
	Bromodichloromethane	SW846-8260B-UP	5	µg/L
	Bromoform	SW846-8260B-UP	5	µg/L
	Bromomethane	SW846-8260B-UP	5	µg/L
	2-Butanone	SW846-8260B-UP	5	µg/L
	Carbon disulfide	SW846-8260B-UP	5	µg/L
	Carbon tetrachloride	SW846-8260B-UP	5	µg/L
	Chlorobenzene	SW846-8260B-UP	5	µg/L
	Chloroethane	SW846-8260B-UP	5	µg/L
	2-Chloroethylvinyl ether	SW846-8260B-UP	10	µg/L
	Chloroform	SW846-8260B-UP	5	µg/L
	Chloromethane	SW846-8260B-UP	5	µg/L
	Dibromochloromethane	SW846-8260B-UP	5	µg/L
	1,2-Dibromo-3-chloropropane	SW846-8260B-UP	10	µg/L
	1,2-Dibromoethane	SW846-8260B-UP	5	µg/L
	Dibromomethane	SW846-8260B-UP	5	µg/L
	1,2-Dichlorobenzene	SW846-8260B-UP	5	µg/L
	1,4-Dichlorobenzene	SW846-8260B-UP	5	µg/L
	1,4-Dichloro-2-butene	SW846-8260B-UP	5	µg/L
	trans-1,4-Dichloro-2-butene	SW846-8260B-UP	5	µg/L
	Dichlorodifluoromethane	SW846-8260B-UP	5	µg/L
	1,1-Dichloroethane	SW846-8260B-UP	5	µg/L
	1,2-Dichloroethane	SW846-8260B-UP	5	µg/L
	1,1-Dichloroethene	SW846-8260B-UP	5	µg/L
	cis-1,2-Dichloroethene	SW846-8260B-UP	5	µg/L
	trans-1,2-Dichloroethene	SW846-8260B-UP	5	µg/L
	1,2-Dichloropropane	SW846-8260B-UP	5	µg/L

Table B.2 (continued)

Parameter Group	Analyte	Analytical Method [1]	Reporting Limit [2]	Units [3]
VOC(1) (continued)	cis-1,3-Dichloropropene	SW846-8260B-UP	5	µg/L
	trans-1,3-Dichloropropene	SW846-8260B-UP	5	µg/L
	Ethanol	SW846-8260B-UP	200	µg/L
	Ethylbenzene	SW846-8260B-UP	5	µg/L
	Ethyl methacrylate	SW846-8260B-UP	5	µg/L
	2-Hexanone	SW846-8260B-UP	5	µg/L
	Iodomethane	SW846-8260B-UP	5	µg/L
	4-Methyl-2-pentanone	SW846-8260B-UP	5	µg/L
	Methylene chloride	SW846-8260B-UP	5	µg/L
	Styrene	SW846-8260B-UP	5	µg/L
	1,1,1,2-Tetrachloroethane	SW846-8260B-UP	5	µg/L
	1,1,2,2-Tetrachloroethane	SW846-8260B-UP	5	µg/L
	Tetrachloroethene	SW846-8260B-UP	5	µg/L
	Toluene	SW846-8260B-UP	5	µg/L
	Total Xylene	SW846-8260B-UP	5	µg/L
	1,1,1-Trichloroethane	SW846-8260B-UP	5	µg/L
	1,1,2-Trichloroethane	SW846-8260B-UP	5	µg/L
	Trichloroethene	SW846-8260B-UP	5	µg/L
	Trichlorofluoromethane	SW846-8260B-UP	5	µg/L
	1,2,3-Trichloropropane	SW846-8260B-UP	10	µg/L
	1,1,2-Trichloro-1,2,2-trifluoroethane	SW846-8260B-UP	5	µg/L
	Vinyl acetate	SW846-8260B-UP	10	µg/L
	Vinyl chloride	SW846-8260B-UP	2	µg/L
VOC(2)	1,4-Dioxane	SW846-8260B	5	µg/L
RAD(1)	Gross Alpha Activity	EPA-900.0	3.5	pCi/L
RAD(1)	Gross Beta Activity	EPA-900.0	7.0	pCi/L
RAD(3)	Uranium-234, -235, & -238	Y/P65-7061	0.4	pCi/L
RAD(12)	Technetium-99	Y/P65-7060	10	pCi/L

Notes:

1 N/A - Not Applicable

Field measurements are performed in accordance with the following BWXT Environmental Compliance Division (ECD) and/or Analytical Chemical Organization (ACO) procedures:

Field Measurement	ECD Procedure	ACO Procedure	Field Measurement	ECD Procedure	ACO Procedure
Depth to Water	Y50-71-015	N/A	Dissolved Oxygen	N/A	*-9154
Water Temperature	Y50-71-014	*-9152	REDOX	N/A	*-9156
pH	Y50-71-014	*-9153	Pressure Profile	Y50-71-0158	None
Conductivity	Y50-71-022	*-9160			
Note: * = Y50-AC-65, the prefix for all of these ACO procedures.					

Table B.2 (continued)

Notes: (continued)

1 (continued)

Analytical methods from:

- *Test Methods for Evaluating Solid Waste Physical/Chemical Methods* (U.S. Environmental Protection Agency 1996)
- *Methods for Chemical Analysis of Water and Wastes* (U.S. Environmental Protection Agency 1983)
- BWXT ACO Procedures applicable to the methods shown above in the table:

Method	ACO Procedure	Method	ACO Procedure
EPA-160.1	Y/P65-7914	SW846-6010B	Y50-AC-65-0040
EPA-160.2	Y/P65-7918	SW846-7470	Y50-AC-65-7470
EPA-180.1	Y/P65-7615	SW846-8260B-UP	Y/P65-SW846-8260B
EPA-200.8	Y/P65-0034	Y/P65-7060	Y/P65-7060
EPA-300.0	Y50-AC-65-7619	Y/P65-7061	Y/P65-7061
EPA-310.1	Y/P65-7639		
EPA-340.2	Y/P65-7602		
EPA-900.0	Y50-AC-65-7074		

2 NA - not applicable

VOC(1,2) - Reporting limits are contract-required quantitation limits; also report estimated values (with qualifier) below this limit and above the instrument detection limit.

RAD(1,3,12) - Reporting limits are target minimum detectable activities (MDAs) that may be obtained under optimal analytical conditions; actual MDAs are sample-specific and may vary significantly from the target value.

3 ft - feet
µg/L - micrograms per liter
µmho/cm - micromhos per centimeter
mg/L - milligrams per liter
mV - millivolts
NTU - nephelometric turbidity units
ppm - parts per million
pCi/L - picoCuries per liter

APPENDIX C

MONITORING FREQUENCY FOR CY 2007 SAMPLING LOCATIONS

Appendix C. Monitoring Frequency for CY 2007 Sampling Locations

Sampling Location	Regime[1]	MAROS Information			GWPP Final Frequency[3]	Explanation[4] (GWPP differs from MAROS)
		Trend[2]	Preliminary Frequency	Final Frequency		
Monitoring Wells						
55-1A	EF	N/A	Annual	Review	**Annual**	Selected for Review
55-2A	EF	.	.	Omitted	SemiAnnual	Selected for Review, no recent data
55-2B	EF	PI	SemiAnnual	SemiAnnual	SemiAnnual	
55-2C	EF	S	Annual	Annual	Annual	
55-3A	EF	.	.	Omitted	SemiAnnual	Selected for Review, no recent data
55-3B	EF	.	.	Omitted	SemiAnnual	Selected for Review, no recent data
55-3C	EF	.	.	Omitted	SemiAnnual	Selected for Review, no recent data
56-1A	EF	.	.	Omitted	SemiAnnual	Selected for Review, no recent data
56-2A	EF	N/A	SemiAnnual	Review	**Annual**	Selected for Review, 2006
56-2B	EF	N/A	SemiAnnual	Review	**Annual**	Selected for Review, 2006
56-2C	EF	S	Annual	Annual	Annual	
56-3A	EF	.	.	Omitted	SemiAnnual	Selected for Review, no recent data
56-3B	EF	.	.	Omitted	SemiAnnual	Selected for Review, no recent data
56-3C	EF	.	.	Omitted	SemiAnnual	Selected for Review, no recent data
56-4A	EF	.	.	Omitted	SemiAnnual	Selected for Review, no recent data
56-6A	EF	.	.	Omitted	SemiAnnual	Selected for Review, no recent data
56-8A	EF	.	.	Omitted	SemiAnnual	Selected for Review, no recent data
60-1A	EF	.	.	Omitted	SemiAnnual	Selected for Review, no recent data
GW-014	BC	N/A	SemiAnnual	SemiAnnual	SemiAnnual	
GW-052	BC	N/A	Annual	Review	**Odd**	Selected for Review
GW-053	BC	PD	Annual	Biennial	Odd	
GW-071	BC	NT	SemiAnnual	SemiAnnual	SemiAnnual	
GW-072	BC	N/A	Remove	Remove	**Odd**	Selected for Review
GW-082	BC	I	SemiAnnual	SemiAnnual	**Annual**	Add CY 05 Data; Trend decreasing/stable
GW-085	BC	PI	SemiAnnual	SemiAnnual	SemiAnnual	
GW-089	BC	N/A	Biennial	Review	**Odd**	Selected for Review
GW-098	BC	NT	Annual	Annual	Annual	
GW-100	BC	N/A	SemiAnnual	Annual	**Odd**	Some older data available
GW-101	BC	N/A	SemiAnnual	Annual	**Odd**	Some older data available
GW-105	EF	N/A	SemiAnnual	Annual	Annual	
GW-106	EF	N/A	SemiAnnual	Annual	Annual	
GW-109	EF	NT	SemiAnnual	SemiAnnual	**Annual**	Deep, near source/ Redundant with GW-108
GW-122	BC	N/A	Annual	Review	**Annual**	Selected for Review, 2006
GW-127	BC	N/A	Annual	Annual	**Odd**	Some older data available
GW-153	EF	S	Annual	Annual	Annual	
GW-174	CR	N/A	SemiAnnual	Review	**Odd**	Selected for Review
GW-176	CR	N/A	Annual	Review	**Odd**	Selected for Review
GW-179	CR	N/A	Annual	Review	**Odd**	Selected for Review
GW-180	CR	N/A	SemiAnnual	Review	**Odd**	Selected for Review
GW-192	EF	NT	Annual	Annual	Annual	
GW-204	EF	PD	Biennial	Biennial	**Annual**	Located near process building
GW-219	EF	D	Annual	Regulated	**Odd**	Located near source
GW-220	EF	I	SemiAnnual	Regulated	SemiAnnual	
GW-225	BC	NT	SemiAnnual	SemiAnnual	SemiAnnual	
GW-226	BC	S	SemiAnnual	SemiAnnual	SemiAnnual	
GW-229	BC	S	Annual	Annual	Annual	
GW-236	BC	N/A	SemiAnnual	Annual	**Odd**	Older useful data, decreasing trend
GW-240	EF	S	Annual	Annual	Annual	

Appendix C. Monitoring Frequency for CY 2007 Sampling Locations

Sampling Location	Regime[1]	MAROS Information			GWPP Final Frequency[3]	Explanation[4] (GWPP differs from MAROS)
		Trend[2]	Preliminary Frequency	Final Frequency		
GW-246	BC	N/A	SemiAnnual	SemiAnnual	SemiAnnual	
GW-251	EF	S	Annual	Annual	Annual	
GW-257	BC	N/A	SemiAnnual	SemiAnnual	**Annual**	Older useful data, stable trend
GW-265	EF	N/A	Biennial	Review	**SemiAnnual**	Selected for Review
GW-269	EF	N/A	Annual	Review	**SemiAnnual**	Selected for Review
GW-270	EF	N/A	SemiAnnual	Review	**Odd**	Selected for Review
GW-272	EF	N/A	Annual	Review	**Odd**	Selected for Review
GW-273	EF	N/A	Annual	Review	**Odd**	Selected for Review
GW-274	EF	PD	Annual	Annual	Annual	
GW-275	EF	S	Annual	Annual	Annual	
GW-277	BC	N/A	Annual	Review	**Odd**	Selected for Review
GW-289	BC	PI	SemiAnnual	SemiAnnual	**Annual**	Older useful data, stable trend
GW-307	BC	N/A	Biennial	Review	**Odd**	Selected for Review
GW-313	BC	N/A	Annual	Review	**Odd**	Selected for Review
GW-315	BC	PD	Annual	Annual	Annual	
GW-332	EF	N/A	Annual	Annual	Annual	
GW-336	EF	N/A	Annual	Annual	Annual	
GW-337	EF	S	Annual	Annual	Annual	
GW-368	BC	N/A	Biennial	Review	**Odd**	Selected for Review
GW-369	BC	N/A	Biennial	Review	**Odd**	Selected for Review
GW-381	EF	NT	Annual	Regulated	Annual	
GW-383	EF	NT	SemiAnnual	Regulated	**SemiAnnual**	
GW-505	EF	N/A	Annual	Review	**Odd**	Selected for Review
GW-537	BC	D	Annual	Annual	Annual	
GW-601	BC	N/A	Biennial	Review	**Odd**	Selected for Review
GW-612	CR	NT	Annual	Annual	Annual	
GW-615	BC	N/A	SemiAnnual	**SemiAnnual**	**Annual**	Abundant older data; Deep, near source
GW-616	BC	N/A	SemiAnnual	Annual	Annual	
GW-620	EF	D	Annual	Annual	Annual	
GW-626	BC	PI	SemiAnnual	SemiAnnual	SemiAnnual	
GW-627	BC	I	SemiAnnual	SemiAnnual	SemiAnnual	
GW-653	BC	I	Annual	Annual	Annual	
GW-656	EF	S	Annual	Annual	Annual	
GW-686	EF	N/A	Annual	Review	**SemiAnnual**	Selected for Review
GW-690	EF	S	Annual	Annual	Annual	
GW-691	EF	N/A	SemiAnnual	Annual	Annual	
GW-692	EF	N/A	Annual	Remove	**Annual**	Selected for Review
GW-694	BC	NT	SemiAnnual	SemiAnnual	**Annual**	Abundant older data; sampled 2X in 2005
GW-698	EF	NT	SemiAnnual	SemiAnnual	SemiAnnual	
GW-700	EF	PD	Annual	Annual	Annual	
GW-703	BC	NT	Annual	Annual	Annual	
GW-722-06	EF	.	.	Omitted	Annual	Not in assessment; Long term perimeter
GW-722-10	EF	.	.	Omitted	Annual	monitoring Westbay well ports
GW-722-14	EF	.	.	Omitted	Annual	"
GW-722-17	EF	.	.	Omitted	Annual	"
GW-722-20	EF	.	.	Omitted	Annual	"
GW-722-22	EF	.	.	Omitted	Annual	"
GW-722-26	EF	.	.	Omitted	Annual	"

Appendix C. Monitoring Frequency for CY 2007 Sampling Locations

Sampling Location	Regime[1]	MAROS Information			GWPP Final Frequency[3]	Explanation[4] (GWPP differs from MAROS)
		Trend[2]	Preliminary Frequency	Final Frequency		
GW-722-30	EF	.	.	Omitted	Annual	"
GW-722-32	EF	.	.	Omitted	Annual	"
GW-722-33	EF	.	.	Omitted	Annual	"
GW-724	BC	S	Annual	Annual	Annual	
GW-725	BC	PI	Annual	Annual	Annual	
GW-735	EF	S	Annual	Biennial	Odd	
GW-738	BC	D	Annual	Annual	Annual	
GW-740	BC	PD	Annual	Annual	Annual	
GW-744	EF	S	Biennial	Regulated	**Annual**	Long term perimeter monitoring
GW-747	EF	PI	Biennial	Regulated	**Annual**	Long term perimeter monitoring
GW-750	EF	NT	Biennial	Biennial	Odd	
GW-763	EF	NT	Annual	Annual	Annual	
GW-765	EF	N/A	Biennial	Biennial	Odd	
GW-769	EF	I	SemiAnnual	SemiAnnual	SemiAnnual	
GW-770	EF	I	SemiAnnual	SemiAnnual	SemiAnnual	
GW-775	EF	NT	Annual	Biennial	Odd	
GW-776	EF	S	Annual	Biennial	Odd	
GW-781	EF	PI	Annual	Annual	Annual	
GW-782	EF	D	Annual	Annual	Annual	
GW-783	EF	S	Annual	Annual	Annual	
GW-791	EF	S	Annual	Annual	Annual	
GW-792	EF	S	Annual	Annual	Annual	
GW-816	EF	S	Biennial	Regulated	**Annual**	Long term perimeter monitoring
GW-820	EF	NT	SemiAnnual	SemiAnnual	SemiAnnual	
GW-954-1	EF	.	.	Omitted	SemiAnnual	New Location, not in program assessment
GW-954-2	EF	.	.	Omitted	SemiAnnual	New Location, not in program assessment
GW-954-3	EF	.	.	Omitted	SemiAnnual	New Location, not in program assessment
GW-956-1	EF	.	.	Omitted	SemiAnnual	New Location, not in program assessment
GW-956-2	EF	.	.	Omitted	SemiAnnual	New Location, not in program assessment
GW-956-3	EF	.	.	Omitted	SemiAnnual	New Location, not in program assessment
GW-956-4	EF	.	.	Omitted	SemiAnnual	New Location, not in program assessment
GW-959	EF	.	.	Omitted	Annual	New Location, quarterly sampling completed
Surface Water/Springs						
BCK-04.55	BC	.	.	Omitted	**Annual**	Long-term exit pathway station
NT-01	BC	.	.	Omitted	**Annual**	Long-term exit pathway station
SS-1	BC	S	Annual	Annual	Annual	
SS-4	BC	D	Annual	Annual	Annual	
SS-5	BC	S	Annual	Annual	Annual	
SCR1.5SW	CR	.	.	Omitted	**Annual**	Long-term exit pathway station
SCR2.1SP	CR	S	Biennial	Biennial	**Annual**	Long-term exit pathway station
SCR2.2SP	CR	S	Biennial	Biennial	**Annual**	Long-term exit pathway station
SCR3.5SW	CR	.	.	Omitted	**Annual**	Long-term exit pathway station
S17	CR	.	.	Omitted	**Annual**	Long-term exit pathway station
NPR07.0SW	NPR	.	.	Omitted	**Annual**	Long-term exit pathway station
NPR12.0SW	NPR	.	.	Omitted	**Annual**	Long-term exit pathway station
NPR23.0SW	NPR	.	.	Omitted	**Annual**	Long-term exit pathway station
GHK2.51WSW	NPR	.	.	Omitted	**Annual**	Long-term exit pathway station

Appendix C. Monitoring Frequency for CY 2007 Sampling Locations

Notes:

1. Regime

BC =	Bear Creek Hydrogeologic Regime
CR =	Chestnut Ridge Hydrogeologic Regime
EF =	Upper East Fork Poplar Creek Hydrogeologic Regime
NPR =	North of Pine Ridge

2. Trend

D =	Decreasing
I =	Increasing
N/A =	Not Applicable
NT =	No Trend
PD =	Probably Decreasing
PI =	Probably Increasing
S =	Stable

3. GWPP Final Frequency (shown in **bold** typeface if different from MAROS recommendation)

Annual =	Sample collection once per year
Odd =	Sample collection every other year, starting in 2007
Semiannual =	Sample collection twice per year

4. Explanation for sampling locations where the GWPP Final Frequency differs from the MAROS Final Frequency, based on information from the Sample Priority Score calculations and other information not included in the MAROS assessment.

APPENDIX D

LABORATORY REQUIREMENTS
(Bottle Lists, Holding Times, Turnaround Time, Elevated Minimum Activity)

STD

Parameter	Chemical Preservative [1]	Bottle Types/Size
Anions, Turbidity, and Fluoride	None	1 - 250 mL polyethylene
Total Suspended Solids	None	1 - 250 mL polyethylene
Total Dissolved Solids	None	1 - 250 mL polyethylene
Carbonate, Bicarbonate	None	1 - 250 mL polyethylene
Total Metals (ICP,ICP-MS, and Hg)	HNO_3	1 - 500 mL polyethylene
Radiochemistry (UV / Y-12)	HNO_3	1 – 1 L polyethylene
VOA	None	2 - 40 mL amber glass with Teflon lined septum lids
Trip Blank (VOA) **(one per cooler)**	None	1 - 40 mL amber glass with Teflon lined septum lid

STD:	**ESLIMS LAB TEST ID**
FLD	GWTRSAMP or GWSWSAMP
CHEM	ALKALINITY-I, ANIONS, FLUORIDE, SOLIDS-TOT-S, SOLIDS-TOT-D, TURBIDITY
MET(1)	ICP6010, ICPMSGW and HG7470
VOC(1)	VOA8260GW
RAD(1)	Gross Alpha Beta (GROSSAB-ENV)

[1] Samples chilled to 4 +/- 2C

STD, VOC(2)

Parameter	Chemical Preservative [1]	Bottle Types/Size
Anions, Turbidity, and Fluoride	None	1 - 250 mL polyethylene
Total Suspended Solids	None	1 - 250 mL polyethylene
Total Dissolved Solids	None	1 - 250 mL polyethylene
Carbonate, Bicarbonate	None	1 - 250 mL polyethylene
Total Metals (ICP,ICP-MS, and Hg)	HNO_3	1 - 500 mL polyethylene
Radiochemistry (UV / Y-12)	HNO_3	1 – 1 L polyethylene
VOA	None	2 - 40 mL amber glass with Teflon lined septum lids
VOADIOXANE		2 - 40 mL amber glass with Teflon lined septum lids
Trip Blank (VOA) **(one per cooler)**	None	1 - 40 mL amber glass with Teflon lined septum lid

STD:	**ESLIMS LAB TEST ID**
FLD	GWTRSAMP or GWSWSAMP
CHEM	ALKALINITY-I, ANIONS, FLUORIDE, SOLIDS-TOT-S, SOLIDS-TOT-D, TURBIDITY
MET(1)	ICP6010, ICPMSGW and HG7470
VOC(1)	VOA8260GW
VOC(2)	VOADIOXANE
RAD(1)	Gross Alpha Beta (GROSSAB-ENV)

[1] Samples chilled to 4 +/- 2C

STD, RAD (3,12)

Parameter	Chemical Preservative[1]	Bottle Types/Size
Anions, Turbidity, and Fluoride	None	1 – 250 mL polyethylene
Total Suspended Solids	None	1 – 250 mL polyethylene
Total Dissolved Solids	None	1 – 250 mL polyethylene
Carbonate, Bicarbonate	None	1 – 250 mL polyethylene
Total Metals (ICP,ICP-MS, and Hg)	HNO_3	1 – 500 mL polyethylene
Radiochemistry (UV / Y12)	HNO_3	1 – 1L polyethylene 1 – 500 mL polyethylene
VOA	None	2 – 40 mL amber glass with Teflon lined septum lids
Trip Blank (VOA) **(one per cooler)**	None	1 – 40 mL amber glass with Teflon lined septum lid

STD:	**ESLIMS LAB TEST ID**
FLD	GWTRSAMP or GWSWSAMP
CHEM	ALKALINITY-I, ANIONS, FLUORIDE, SOLIDS-TOT-S, SOLIDS-TOT-D TURBIDITY
MET(1)	ICP6010, ICPMSGW and HG7470
VOC(1)	VOA8260GW

RAD (1)	Gross Alpha Beta (GROSSAB-ENV)	500 mL	preserved w HNO_3
RAD (3)	^{234}U, ^{235}U, ^{238}U (ASPECU-ENV)	500 mL	preserved w HNO_3
RAD (12)	Tc-99 (TC99LS-ENV)	500 mL	preserved w HNO3

[1] Samples chilled to 4 +/- 2C

WESTBAY

Parameter	Chemical Preservative [1]	Bottle Types/Size
Anions, Turbidity, and Fluoride	None	1 - 250 mL polyethylene
Total Suspended Solids	None	1 - 250 mL polyethylene
Total Dissolved Solids	None	1 - 250 mL polyethylene
Carbonate, Bicarbonate	None	1 - 250 mL polyethylene
Total Metals (ICP,ICP-MS, and Hg)	HNO_3	1 - 250 mL polyethylene
Radiochemistry (UV / Y-12)	HNO_3	1 – 500 mL polyethylene
VOA	None	2 - 40 mL amber glass with Teflon lined septum lids
Trip Blank (VOA) **(one per cooler)**	None	1 - 40 mL amber glass with Teflon lined septum lid

STD:	**ESLIMS LAB TEST ID**		
FLD	GWTRSAMP		
CHEM	ALKALINITY-I, ANIONS, FLUORIDE, SOLIDS-TOT-S, SOLIDS-TOT-D, TURBIDITY		
MET(1)	ICP6010, ICPMSGW and HG7470		
VOC(1)	VOA8260GW		
RAD(1)	Gross Alpha Beta (GROSSAB-ENV)	500 mL	preserved w HNO_3

[1] Samples chilled to 4 +/- 2C

VOC (1)

Parameter	Chemical Preservative [1]	Bottle Types/Size
VOA	None	2 – 40 mL amber glass with Teflon lined septum lid

VOC(1) VOA8260GW

[1] Samples chilled to 4 +/- 2C

ESTABLISHED HOLDING TIMES

Parameter	Holding Times
Alkalinity (Carbonate, Bicarbonate)	14 days
Anions (Chloride, Nitrate, Sulfate)	48 hr
Fluoride	28 days
Mercury	28 days
Metals (ICP, ICPMS)	6 months
Radiochemistry (except tritium)	6 months
Solids, Total Dissolved	7 days
Solids, Total Suspended	7 days
Tritium	No EPA guidance
Uranium by Thermal Ionization Mass Spec	6 months
VOA	7 days

ESTABLISHED TURNAROUND TIMES

The Groundwater Protection Program and the Analytical Chemistry Organization (ACO) laboratory have agreed upon a turnaround time, such that the analytical data generated from all sample locations within a sample group will be transmitted to the Data Manager as a data deliverable. Currently, the turnaround time for all sample groups is 35 days from the receipt of the last sample within a group. Data is transmitted in the form of hard copy of the completed and approved lab reports for each location, along with an electronic copy in a standardized and compatible format (please see the most recent version of the *Y-12 Plant Groundwater Protection Program Data Management Plan*.

ELEVATED MINIMUM DETECTABLE ACTIVITY

Groundwater samples with high TDS (>1,000 mg/L) typically have elevated minimum detectable activities (MDAs) for gross alpha (> 15 pCi/L) and gross beta (> 50 pCi/L). However, the MDAs for specific isotopic analyses are unaffected by the sample solid content. For samples with gross activity results that are less than an elevated MDA, and specific isotopic analyses have not been requested, the laboratory will issue a request to analyze for the principal alpha- or beta-emitting isotopes. That is, if the gross alpha MDA exceeds 15 pCi/L and the result is less than 15 pCi/L, then the laboratory will request analyses of isotopic uranium (by method Y/P65-7061). Similarly, if a sample has an elevated gross beta MDA (>50 pCi/L) and the result is less than the MDA, then the laboratory would request analysis of technetium-99 activity. These requests will be approved by the Y-12 Groundwater Protection Program manager, or designee, before analyses are performed.

APPENDIX E

ADDENDA TO THE CY 2007 SAMPLING AND ANALYSIS PLAN
(if issued)

APPENDIX F

CY 2007 GROUNDWATER MONITORING SCHEDULES

APPENDIX G

MANAGEMENT OF PURGED GROUNDWATER

Y-12 GROUNDWATER PROTECTION PROGRAM
PURGE WATER MANAGEMENT

The Y-12 Groundwater Protection Program (GWPP) generates purge water from groundwater sampling activities. Purge water is defined as groundwater removed from the well prior to sample collection, and is considered a waste as determined by the U.S. Environmental Protection Agency (EPA). Based upon characterization of each well's analytical results (1991-2006), if required (see below), the water is contained, managed, and dispose of at on-site treatment facilities. Characterization of the purge water involves a review of the most recent analytical results, or a reliance on historical data, to determine if constituents in the water exceed one of the following regulatory/guidance requirements: a Safe Drinking Water Act (SDWA) Maximum Contaminant Level (MCL), a Resource, Conservation, and Recovery Act (RCRA) Toxicity Characteristic Leaching Procedure (TCLP) level (characteristic), or a DOE derived concentration guideline (DCG) for radionuclides as per DOE Order 5400.5. In addition, the water from wells located around disposal areas where RCRA F-listed wastes were possibly emplaced is designated as a multi-source leachate (F039), if constituents in the water exceed a health based level (MCL). Purge water whose constituents do not exceed one of these requirements is not contained and is dispensed to the ground surface.

In a letter dated May 24, 2006, the Y-12 National Security Complex (EPA ID TN3 89-009-0001) received concurrence by the State of Tennessee on a proposed plan (letter to TDEC, dated April 25, 2006 and February 22, 2006) by BWXT-Y12 LLC to accumulate RCRA regulated purge water (characteristic and listed) in two separate RCRA Satellite Accumulation Areas (SAAs) at a centralized location at Y-12. This concurrence allowed BWXT Y-12 (GWPP) to consolidate purge water in two RCRA SAAs that are not "physically located at or near the point of generation"; the point of generation being the well location. This plan demonstrated to the State of Tennessee the large number of well locations that can generate RCRA wastes during sampling around Y-12 and its surrounding area (approximately 5 miles in length – Scarboro Rd to Bear Creek Burial Grounds).

In CY 2007, RCRA waste streams will be collected, transported, and accumulated in two RCRA SAAs, owned and operated by the GWPP:

1) **SA-992** – contains RCRA characteristic wastes with EPA waste codes: D005, D006, D019, D029, D039, D040, and D043 (waste stream ID = "SID 2216")
2) **SA-993** – contains RCRA F-listed wastes with EPA waste code: F039 (waste stream ID = "SID 2214")

The above SAAs are located within a HAZMAT drum storage locker, with a secondary containment system, located on the southwest corner of Building 9108 (in the 9201-3 north parking lot). The SAAs areas will be operated and managed in accordance with procedure Y71-933; *Resource, Conservation, and Recovery Act (RCRA) Hazardous Waste Satellite Accumulation Area Management for the Y-12 Complex*, with the exception of noted exemptions stated in the above referenced letter. These exemptions include: 1) more than one SAA allowed in a room or area (SR-12 on the RCRA Satellite Accumulation Area Inspection Checklist: UCN-21227), 2) waste is accumulated away from the point of generation (SR-07), and 3) waste containers can be can remain in the SAA greater than 90 days without the addition of waste (SR-13). In accordance with the above procedure, the two SAAs will be inspected weekly by the operator or alternate

operator, and these inspections will be documented on the checklist. All training requirements will be met and documented. Each time purgewater is added to a drum, a record of date, time, and the amount of liquid added to each container will be kept, and the drum (55-gallon capacity) will be moved to a permitted RCRA 90-day storage facility within 3 calendar days of the container reaching 50 gallon. Drums will not be store for greater than one year from the time the first waste was added. In addition, requirements of procedures: Y71-310; *Waste Container Labeling* and Y71-934; *Environmental Requirements for Portable Container Storage*, will be followed.

The groundwater well locations to be sampled for CY 2007 are listed in Appendix B (Table B.1) of this document. The waste streams have been identified and assigned for each well and are listed in Table G.1.of this appendix, along with the designated EPA waste code. Wells will be identified in subsequent Groundwater Monitoring Schedules (GWMS) by the waste stream ID listed below. The descriptions of these three waste streams are as follows:

SID 2212 – purge water which exceeds a SDWA MCL or 4% of the DCG

SID 2216 – purge water which exceeds a RCRA TCLP or 25% of the DCG

SID 2214 – purge water that carries an F-listing or contains a multi-source leachate (F039). **Currently**, only purge water emanating from the Bear Creek Burial Grounds Waste Management Area (BCBG) is considered to be **a possible** multi-source leachate. Based on process knowledge of waste disposal practices during the operation of the BCBG and an understanding of the groundwater hydrology, an administrative decision was made to consider purge water in this waste stream if it was generated from a well located between north tributary (NT) 6, NT 8, and north of Bear Creek, whose constituents exceed a SDWA MCL.

The volume of purge water generated during a sampling event is generally 3 to 5 gallons for wells sampled using the Low Flow Minimal Draw-down Sampling Method (see procedure Y50-71-016, Rev 1.0). For wells instrumented with Westbay systems the volume of purge water is significantly less, and for wells instrumented with BarCad® positive gas displacement systems the purge volumes range from 1 to 11 gallons per BarCad® unit. Purge water under waste stream SID 2212 (non-regulated) will be dispensed to a 5-gallon DOT approved container (no shipping papers) and transported to a designated area at building 9108 where the water will be bulked into 55-gallon drums. Purge water containment in this waste stream will follow quarterly sampling (i.e., when a new quarter starts, purgewater will be dispensed to a new drum).

Purge water under waste streams SID 2214 will be transported from the well location in a 5-gallon DOT approved container(s) under a BWXT Y-12 Bill of Lading (shipping papers) to SA-993. Purge water under waste stream SID 2216 will be handled in the same manner but will be accumulated in SA-992. The Bill of Lading will be based upon the EPA waste code(s), or the hazardous constituent, associated with each well location (see Table G.1). The Bill of Lading will contain the proper shipping name, hazard class and division, technical name of waste (e.g. hazardous liquid waste), EPA waste code, emergency contact, and quantity of material. Each container must be labeled with the consignee's name and address, proper shipping name, technical name, and the EPA waste code. The Y-12 Plant Shift Superintendent (574-7172) must be contacted prior to movement of waste. Personnel shipping purge water with hazardous waste will be trained by the BWXT Transportation Dept.

All containers will be labeled in accordance with procedures Y71-310 and Y71-933. Examples of information to be recorded on the UCN 2114B tags (non-regulated) and the UCN 2114A tags (regulated) for each GWPP waste stream are provided in this appendix. All drums of RCRA waste will be moved to the permitted RCRA 90-day accumulation area at Y-12 once the drum reaches 50 gallons. The Y-12 RCRA 90-day yard will be responsible for sampling drums for Total Uranium and weight % U235 and completing the Waste Item Description forms (UCN 2109) for disposal. The GWPP will provide all necessary analytical data and completed Process Knowledge documentation (UCN-20116). For non-regulated waste (SID 2212), field personnel will record in a logbook each time waste is placed into the container: the well number, amount (gallons), date, time, and barcode number. The GWPP will complete the necessary UCN 2109 and all associate information (barcodes, PK form, Total U and wt %U235 analyses, and other analyses). All containers/drums must be closed at all times, except when adding waste.

Table G.1. Waste stream identity and RCRA waste code for groundwater purged from wells to be sampled during CY 2006

Sample Group	Well Number	CY 2006 Sampling Qtr	Waste Stream ID (SID #)	RCRA Waste Code
BC-1	GW-014	Q1,Q3	***SID 2214***	F039
	GW-071	Q1,Q3	***SID 2214***	F039
	GW-085	Q1,Q3	SID 2212	.
	GW-225	Q1,Q3	SID 2212	.
	GW-226	Q1,Q3	SID 2212	.
	GW-246	Q1,Q3	SID 2212	.
	GW-626	Q1,Q3	***SID 2214***	F039
	GW-627	Q1,Q3	***SID 2214***	F039
BC-2	GW-052	Q1	SID 2212	.
	GW-053	Q1	***SID 2214***	F039
	GW-072	Q1	***SID 2214***	F039
	GW-082	Q1	***SID 2214***	F039
	GW-257	Q1	***SID 2214***	F039
	GW-287	Q1	***SID 2214***	F039
	GW-289	Q1	***SID 2214***	F039
	GW-089	Q1	***SID 2214***	F039
	GW-653	Q1	***SID 2214***	F039
BC-3	GW-098	Q2	SID 2212	.
	GW-229	Q2	SID 2212	.
	GW-368	Q2	SID 2212	.
	GW-369	Q2	SID 2212	.
	GW-601	Q2	SID 2212	.
	GW-307	Q2	SID 2212	.
	GW-313	Q2	SID 2212	.
	GW-315	Q2	SID 2212	.
BC-4	GW-100	Q3	SID 2212	.
	GW-101	Q3	SID 2212	.
	GW-122	Q3	SID 2212	.
	GW-127	Q3	Not contained	.
	GW-236	Q3	SID 2212	.
	GW-277	Q3	SID 2212	.
	GW-537	Q3	SID 2212	.
	GW-615	Q3	**SID 2216**	D005
	GW-616	Q3	SID 2212	.
BC-5	GW-694	Q3	Not contained	.
	GW-703	Q3	SID 2212	.
	GW-724	Q3	SID 2212	.
	GW-725	Q3	SID 2212	.
	GW-738	Q3	SID 2212	.
	GW-740	Q3	SID 2212	.
CR-1	GW-612	Q2	SID 2212	.
	GW-174	Q2	Not contained	.
	GW-176	Q2	Not contained	.
	GW-179	Q2	Not contained	.
	GW-180	Q2	SID 2212	.

Table G.1 (continued)

Sample Group	Well Number	CY 2006 Sampling Qtr	Waste Stream ID (SID #)	RCRA Waste Code
EF-1	55-2A	Q1,Q3	SID 2212	.
	55-2B	Q1,Q3	**SID 2216**	D039
	55-3A	Q1,Q3	**SID 2216**	D039, D040
	55-3B	Q1,Q3	**SID 2216**	D039, D040, D043
	55-3C	Q1,Q3	**SID 2216**	D039
	56-3A	Q1,Q3	SID 2212	.
	56-3B	Q1,Q3	SID 2212	.
	56-3C	Q1,Q3	**SID 2216**	D039
	56-4A	Q1,Q3	SID 2212	.
	56-6A	Q1,Q3	Not contained	.
EF-2	55-2C	Q1	**SID 2216**	D039
	56-2A	Q1	SID 2212	.
	56-2B	Q1	**SID 2216**	D039
	56-2C	Q1	**SID 2216**	D039
	GW-272	Q1	SID 2212	.
	GW-274	Q1	**SID 2216**	D005, D039
	GW-275	Q1	**SID 2216**	D005
	GW-337	Q1	**SID 2216**	D039, D040
	GW-336	Q1	SID 2212	.
	GW-332	Q1	**SID 2216**	D039
EF-3	GW-153	Q1	SID 2212	.
	GW-240	Q1	SID 2212	.
	GW-735	Q1	Not contained	.
	GW-750	Q1	Not contained	.
	GW-744	Q1	Not contained	.
	GW-747	Q1	Not contained	.
	GW-816	Q1	Not contained	.
EF-4	GW-722-06	Q3	Not contained	.
	GW-722-10	Q3	Not contained	.
	GW-722-14	Q3	SID 2212	.
	GW-722-17	Q3	SID 2212	.
	GW-722-20	Q3	SID 2212	.
	GW-722-22	Q3	SID 2212	.
	GW-722-26	Q3	Not contained	.
	GW-722-30	Q3	Not contained	.
	GW-722-32	Q3	Not contained	.
	GW-722-33	Q3	Not contained	.
EF-5	56-1A	Q2,Q4	Not contained	.
	56-8A	Q2,Q4	SID 2212	.
	GW-265	Q2,Q4	SID 2212	.
	GW-269	Q2,Q4	SID 2212	.
	GW-686	Q2,Q4	SID 2212	.
	GW-698	Q2,Q4	SID 2212	.
	GW-954-1	Q2,Q4	Not contained	.
	GW-954-2	Q2,Q4	Not contained	.
	GW-954-3	Q2,Q4	Not contained	.

Table G.1 (continued)

Sample Group	Well Number	CY 2006 Sampling Qtr	Waste Stream ID (SID #)	RCRA Waste Code
EF-6	60-1A	Q2,Q4	Not contained	
	GW-220	Q2,Q4	**SID 2216**	D019, D039
	GW-383	Q2,Q4	SID 2212	.
	GW-769	Q2,Q4	SID 2212	.
	GW-770	Q2,Q4	SID 2212	.
	GW-820	Q2,Q4	**SID 2216**	D039, D040
	GW-956-1	Q2,Q4	SID 2212	.
	GW-956-2	Q2,Q4	Not contained	.
	GW-956-3	Q2,Q4	Not contained	.
	GW-956-4	Q2,Q4	Not contained	.
EF-7	55-1A	Q2	SID 2212	.
	GW-105	Q2	SID 2212	.
	GW-106	Q2	SID 2212	.
	GW-109	Q2	**SID 2216**	D005,D006
	GW-192	Q2	SID 2212	.
	GW-251	Q2	SID 2212	.
	GW-270	Q2	SID 2212	.
	GW-273	Q2	Not contained	.
	GW-505	Q2	Not contained	.
	GW-620	Q2	SID 2212	.
EF-8	GW-219	Q4	SID 2212	.
	GW-381	Q4	SID 2212	.
	GW-763	Q4	SID 2212	.
	GW-765	Q4	Not contained	.
	GW-775	Q4	Not contained	.
	GW-776	Q4	Not contained	.
	GW-791	Q4	**SID 2216**	D039
	GW-792	Q4	SID 2212	.
	GW-959	Q4	SID 2212	.
EF-9	GW-204	Q4	SID 2212	.
	GW-656	Q4	**SID 2216**	D040
	GW-690	Q4	SID 2212	.
	GW-691	Q4	**SID 2216**	D039
	GW-692	Q4	SID 2212	.
	GW-700	Q4	SID 2212	.
	GW-781	Q4	SID 2212	.
	GW-782	Q4	SID 2212	.
	GW-783	Q4	SID 2212	.

APPENDIX G

Y-12 GWPP PURGE WATER MANAGEMENT

Example of Waste Identification Tag (UCN 2114B)
for SID 2212 purge water

SID 2212

WASTE IDENTIFICATION

TO BE COMPLETED BY REQUESTER

2109 NUMBER: UCN 2109#

DISPOSAL FORM DATE: Start date of drum

LLW START DATE: "N/A"

MATERIAL DESCRIPTION: Purged groundwater from multiple wells. All water is under waste stream SID 2212

TYPE AND SIZE OF CONTAINER (for example, 55-gallon steel drum): 55-gallon poly drum

LOCATION OF MATERIAL: 9108

DEPARTMENT: 50001328 / Y-12 ECD

SIGNATURE: Signature / date

TO BE COMPLETED BY PLANT DISPOSAL COORDINATOR

CHECKED BY | DATE

COMMENTS: Barcode #

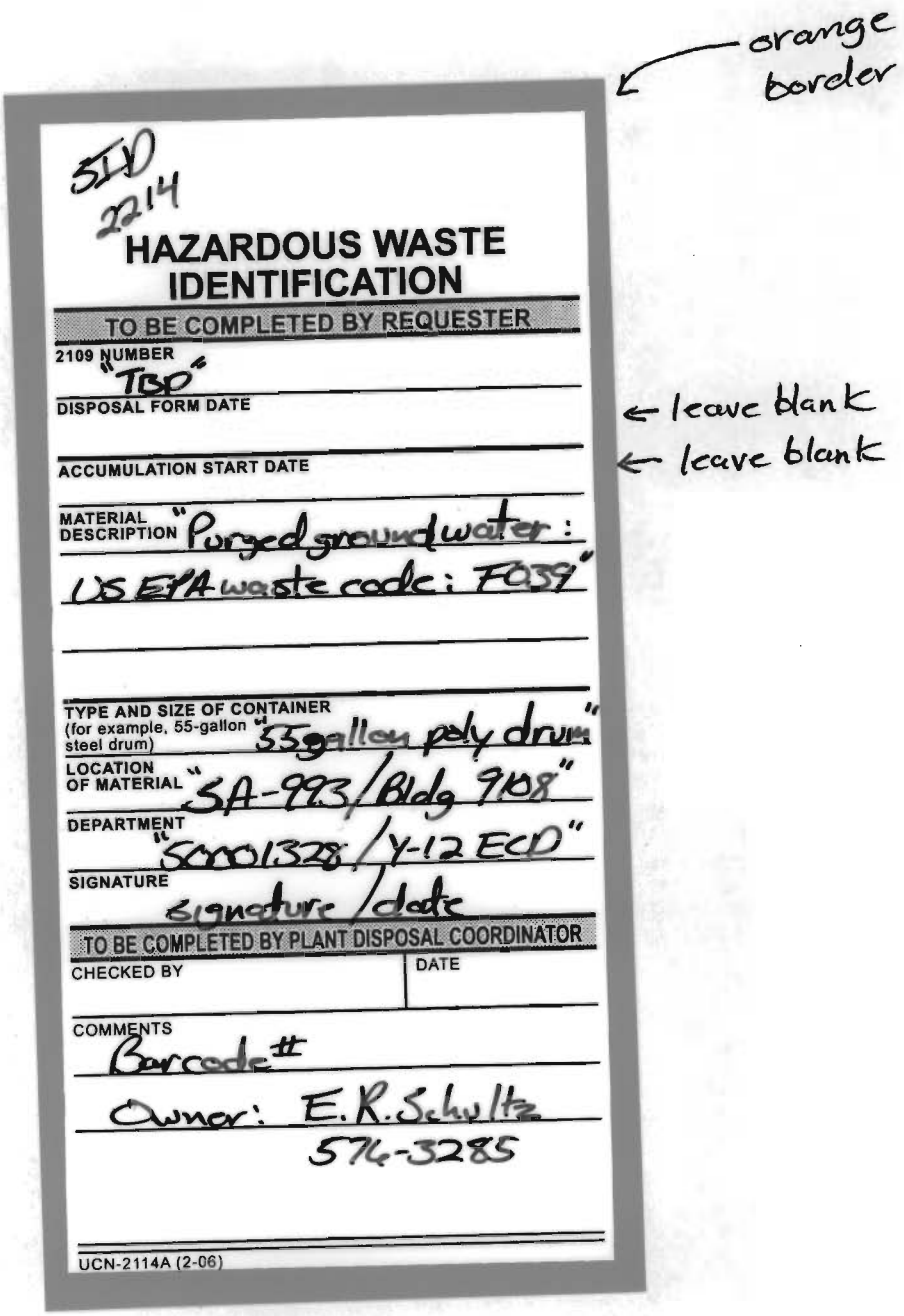
Owner: ER Schultz
574-3285

UCN-2114B (11-05)

APPENDIX G

Y-12 GWPP PURGE WATER MANAGEMENT

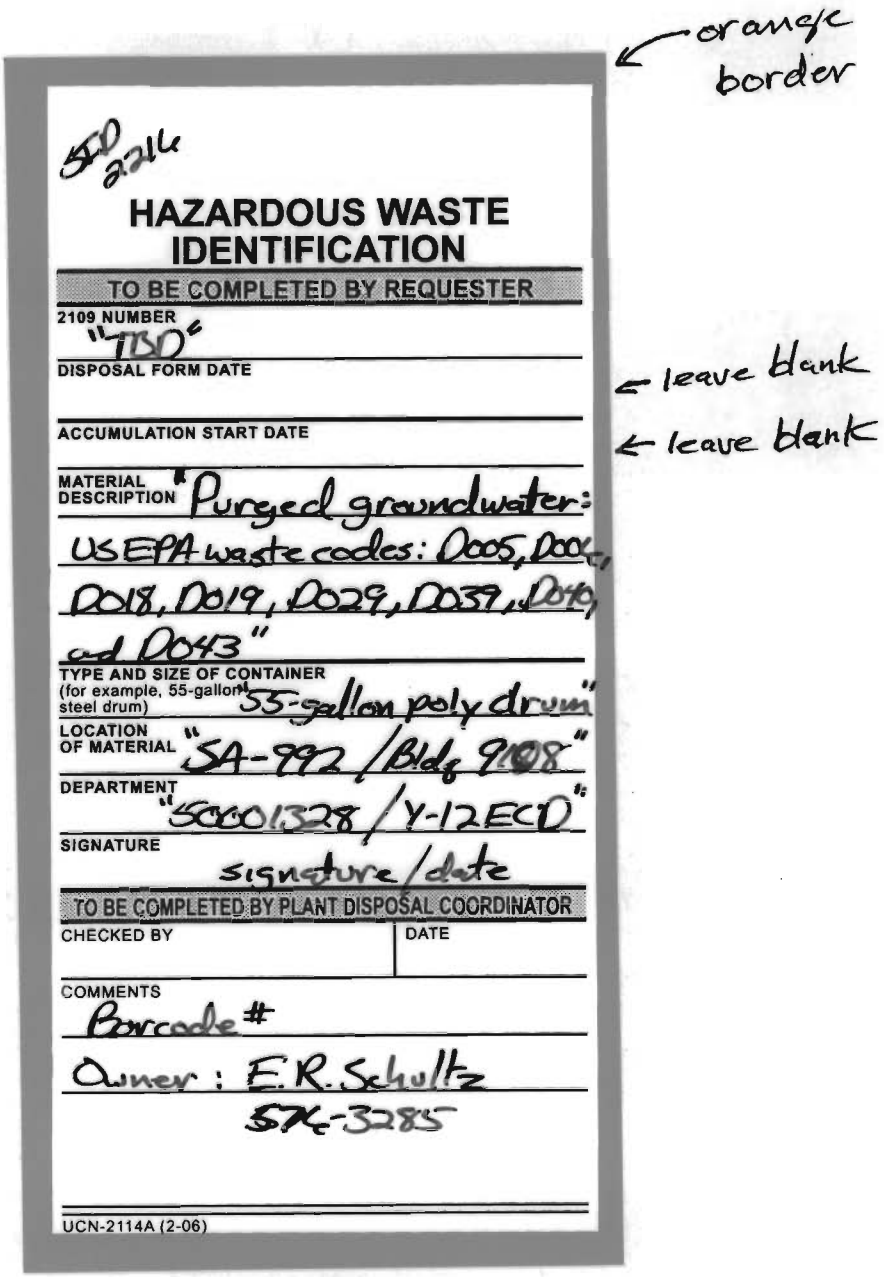
Example of Hazardous Waste Identification Tag (UCN 2114A)
for SID 2214 purge water



APPENDIX G

Y-12 GWPP PURGE WATER MANAGEMENT

Example of Hazardous Waste Identification Tag (UCN 2114A)
for SID 2216 purge water



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J.R. Walker

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION

J.M. Coe
W.K. Jago
D.L. Smith

BECHTEL JACOBS COMPANY LLC

E.L. Berglund
L.M. Sims
R.H. Ketelle
File-EMEF-DMC
File-Y-12 Project PDCC

COMMODORE ADVANCED SCIENCES, INC.

W. Foutz

UT-BATTELLE, LLC

D.B. Watson

TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION DOE OVERSIGHT

D. Gilmore